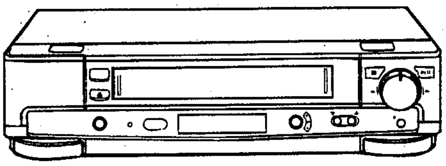
HITACHI

SERVICE MANUAL

TK | No. 4614E

VT-UX615A
VT-UX617A, AW

US MECHANISM



This service manual does not include information on the US Mechanism used in this model.
Refer to the following manual for the US Mechanism.

Manuals to be referred.

Name of manual	Manual No.
US Mechanism	4527E

VHS

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

VCR Plus+ C³ w/Cable Channel Changer

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

June 1996 Image & Information Media Systems Division, Tokai

SAFETY PRECAUTIONS

NOTICE :

Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/ capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing. Therefore, the following checks should be performed for the continued protection of the customer and service technician.

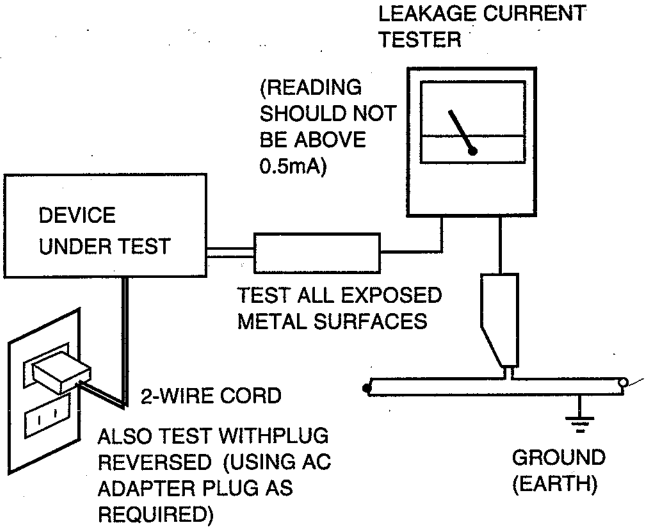
Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V) , connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.) , particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60Hz outlet (do not use an isolation transformer for this check) .

Turn the AC power switch on. Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.) , particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.) . Any current measured must not exceed 0.5 mA.


LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5mA)
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITHPLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
GROUND (EARTH)

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a ⚠ on the schematics and the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies for, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

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CHAPTER 1 GENERAL INFORMATION

1. Specifications

Format :	VHS
Video Signal System :	NTSC color EIA standard
Record/Playback System :	Video : 4 Heads Audio : VHS Hi-Fi stereo record/playback system
Tape Speed :	33.35mm/sec (SP) , 16.67mm/sec (LP) (playback only) , 11.12mm/sec (EP)
RF Input :	UHF/VHF75 ohm
Tuner :	USA : 181 channel tuning ability* (125 cable channels) Canada : 178 channel tuning ability* (122 cable channels)
Type :	Auto programming frequency synthesis
Power Input :	AC120V 60Hz [VT-UX615A/UX617A] AC110-240V 50/60Hz [VT-UX617AW]
Power Consumption :	23W norminal [VT-UX615A] 24W norminal [VT-UX617A,AW]
Cabinet Size :	14-15/16″ (W) × 3-11/16″ (H) × 12-15/16″ (D) 43.5cm (W) × 9.9cm (H) × 28.2cm (D)
Weight :	8.8lbs. (4.0kg)
Storage Temperature :	-4° F to 131° F
Operating Temperature :	41° F to 104° F
Accessories :	1 coaxial cable (Part No. EW10251) 1 remote control unit (Part No. HL10631) [VT-UX615A] 1 remote control unit (Part No. HL10337) [VT-UX617A,AW] 2AA batteries 1 AC plug adaptor (Part No. EY10271) [VT-UX617AW]

Design and specifications subject to change without notice.

2. Comparison with Previous Model

Item	VT-UX615A/UX617A	VT-UX605A
Video		
Video recording/playback system	VHS	VHS
Y/C separation	Comb filter (CCD)	Comb filter
YNR (noise reduction)	Yes	Yes
CNR (noise reduction)	No	Yes
Picture quality function	No	Yes
Color edge clean circuit	No	Yes
New sync circuit	Yes (PB only)	Yes
Picture control	No	Yes (ULTRA VIEW ON/OFF)
S-VHS quasi playback function	No	No
Jacks		
Video/audio inputs (rear)	1/1	1/1
Video/audio inputs (front)	1/1	1/1
Video/audio outputs (rear)	1/1	1/1
Synchro input (front)	No	Yes
Prog.		
VCR Plus + programming	Yes	Yes
Number of timer programs	8 programs/1 year	8 programs/1 year
Auto recording speed	No	No
Remote control		
Model	VT-RM613A [VT-UX615A] VT-RM617A [VT-UX617A,AW]	VT-RM605A
Remote jog/shuttle	No/Yes	Yes/Yes
VCR Plus + code guide channel memory	Yes	Yes
Miscellaneous		
Auto clock setting	Yes	Yes
Jog/Shuttle dial on the VCR	No/Yes	Yes/Yes
Cable box control	Yes	Yes
DSS box control	Yes [VT-UX617A,AW only]	No
Tape navigation	Yes [VT-UX617A,AW only]	Yes
Closed caption	Yes [VT-UX617A,AW only]	Yes
Commercial Advance (CM SKIP)	Yes [VT-UX617A,AW only]	No
Self-diagnosis	Yes (7 modes)	Yes (7 modes)
No. of channels	181	181
Backup time	1 hour	1 hour
Front display (display tube)	LCD	LCD
Mechanism		
Basic chassis type	US	US
Fast forward/rewind time (with T-120)	about 120 seconds	about 120 seconds
Configuration of heads	DA4 heads + Hi-Fi SP video : 2 [48/56 μ m] EP video : 2 [19/19 μ m] Audio : 2 [28/28 μ m]	DA4 heads + Hi-Fi SP video : 2 [48/56 μ m] EP video : 2 [19/19 μ m] Audio : 2 [28/28 μ m]
Material of heads	SP video : Ferrite EP video : Ferrite Audio : Ferrite	SP video : Ferrite EP video : Ferrite Audio : Ferrite
Impedance roller	No	Yes
Head cleaning roller	Yes	Yes

3. Comparison of Main Control ICs

Function	VT-UX615A/UX617A	VT-UX605A
Video		
Y/chroma signal processing	HA118203NF [UX615A] (IC201) HA118203F [UX617A,AW]	HA118401 (IC2201)
CCD 1H delay	MSM7470-72MS (IC202)	MSM7470-72MS (IC2281)
FM signal processing/EQ	Included in IC201	M52375P (IC2301)
CNR	-------------	TA8898AN (IC2401)
Linear Phase EQ/NAVI.data adder	Included in IC201	μPC5023CS-096 (IC2601)
Video AGC	Included in IC201	μPC5023CS-096 (IC2601)
FM audio		
Audio signal processing	AN3964FB (IC501)	TA8863BF (IC5501)
Level meter control	-------------	Included in IC5501
Preamp		
Video head switch	HA118198F (IC1101)	HA118191ANT (IC6101)
Audio head amp	LA7256 (IC1102)	LA7256 (IC6301)
MTS/OSD		
MTS decoder	HTS7337A (IC1801)	HTS7337A (IC1302)
OSD control/Sync separator/AFC	Included in Main μP	Included in Main μP
Servo		
Servo control	Included in Main μP	Included in Main μP
FG/tach amp	Included in Main μP	Included in Main μP
System control		
Main μP (system control μP)	HD6433977SB01F [UX615A] HD6433977SB05F [UX617A,AW] (IC901)	HD6473977F / HD6433977SA55F (IC8901)
VCR-EEPROM	ST24C02-6 (IC903)	ST24C02FM6 / AT24C02N (IC8902)
Loading motor drive	XLA6209-V3 / BA6209 (IC904)	XLA6209-V3 / BA6209 (IC8905)
Timer		
Timer μP	Included in Main μP	Included in Main μP
Display driver	BU9706K (IC1701)	LC75853NE (IC7501)
Expander	-------------	HD49783FP (IC8904)
Auto clock setting	LC7455A (IC2901)	Included in Main μP
CCD		
CCD μP	M37267M8-210SP (IC4401)	M37267M8-200SP (IC4301)
NAVI.-EEPROM	X24C16S8 (IC4402)	X24C16S8 (IC4302)
Reset	PST520CT (IC4403)	PST520C (IC4303)
NAVI. sync separator	MM1108XF (IC4405)	NM1108XF (IC4102)
NAVI. data adder	NJM2249M (IC4406)	Included in IC2601
Commercial Advance		
Commercial Advance (CF-uP)	CXP80712A112Q (IC4501)	-------------
Reset	PST520CT (IC4502)	-------------
Commercial Advance EEPROM	AT24C02 (IC4603)	-------------
Power supply		
Switching driver	-------------	STR-S6705 (IC7101)
A9V regulator	-------------	PQ30RV11 (IC7202)
5V regulator	M5278L05 (IC905)	M5278L05 (IC8401)

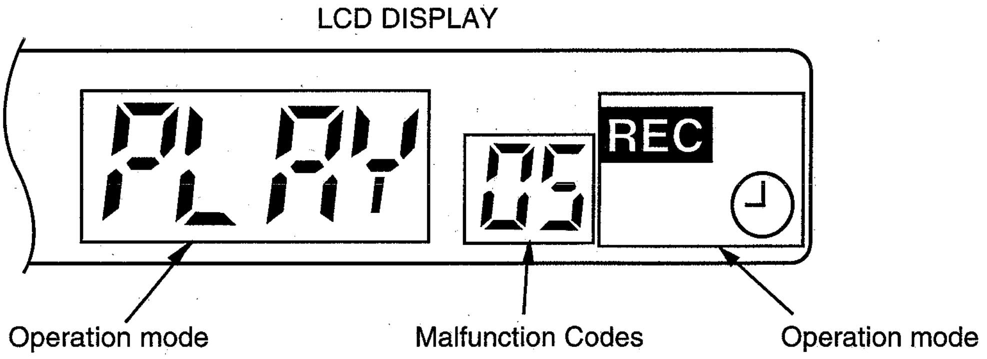
4. Tips for Servicing

4-1. Trouble Display Function

This VCR has a function which displays mechanism malfunctions, etc. in the LCD display. Use this function to analyze the cause when the power is shut off due to a malfunction, etc. in the mechanism.
Two types of information are displayed, (1) The operation mode when the malfunction occurred, (2) Malfunction Codes.
The details of the malfunction are displayed as follows.

Procedure to display a malfunction

Press the "CHANNEL ▼" button on the VCR when the power is turned off and hold it ; the malfunction code is displayed while the button is held depressed.



【Display of Details of Malfunction】

Displayed No.	Item	Details
00	No malfunction	
01	FL mechanism lock	Malfunction in insertion/ejection of cassette
02	Capstan lock	Malfunction of capstan motor drive during tape unloading
04	Reel lock	Reel rotation trouble when tape is running
05	Cylinder lock	Cylinder rotation malfunction
07	Loading mechanism lock	Malfunction in shifting mechanism mode
16	Servo lock	Shorting of 5V detected

【Mode Display when Malfunction Has Occurred】

Mode	Display
Stop	No display
Fast forward	**FF**
Rewind	**REW**
Recording	**REC**
Timer recording	◷ **REC**
Recording pause	**REC** (flashes)

Mode	Display
Playback	**PLAY**
Forward search	**SRCH**
Reverse search	**-SRCH**
Slow	**SLOW**
Still play	**STILL**

No symbols are displayed if the malfunction occurred when a cassette was inserted or ejected, or the power was switched on from off, and off from on.

4-2. How to Remove the Cassette when a Malfunction Has Occurred in the Mechanism

If a cassette is caught in the mechanism because of a malfunction in the mechanism, remove it by the following procedure.

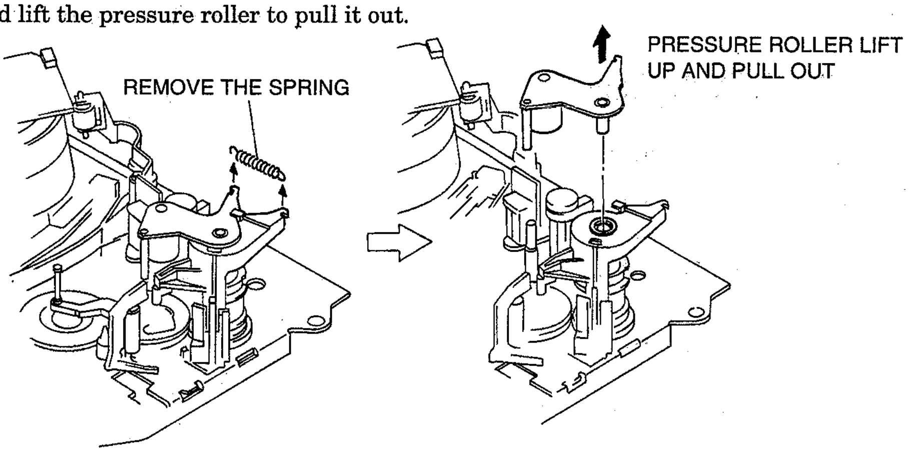
〔Work Procedure〕

1. Remove the top cover.
2. Remove the front panel.

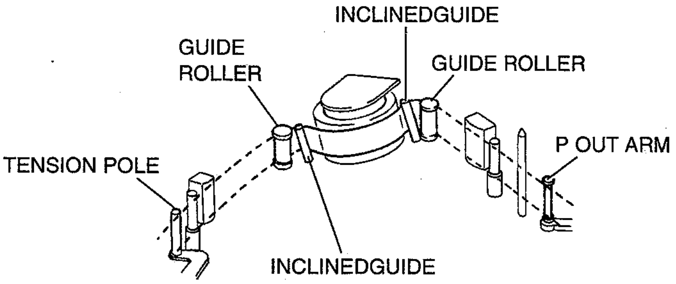
If the tape is wound round the cylinder in the loading state

If the cassette does not come out from the FL mechanism in the unloading state.

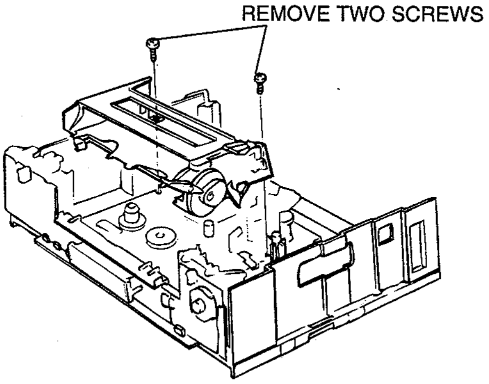
Remove the spring and lift the pressure roller to pull it out.


REMOVE THE SPRING
PRESSURE ROLLER LIFT UP AND PULL OUT

Slacken the tape and release it from the tension pole, guide rollers, inclined guides and P out arm.


INCLINEDGUIDE
GUIDE ROLLER
GUIDE ROLLER
TENSION POLE
P OUT ARM
INCLINEDGUIDE

1) Remove two screws holding the FL mechanism.
2) Hold the cassette lid with your fingers so the tape is not damaged and remove the FL mechanism.
3) Remove the slack tape and eject the cassette.


REMOVE TWO SCREWS

4-3. Tape Navigation Demo Mode [VT-UX617A,AW]

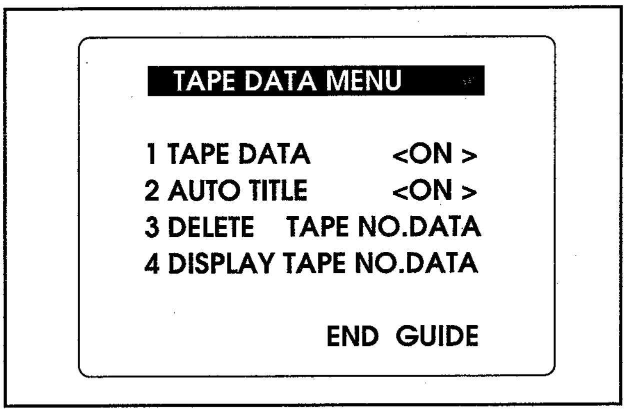
This function automatically displays the tape navigation screen and the program search screen. This is used to demonstrate tape navigation at video stores.

[Preparation]

Specify TAPE DATA [ON] .

《Procedure》

1) Press the "GUIDE" button of the remote control.
2) Press "5" to display the tape data menu.
3) Press "1" to specify TAPE DATA [ON] .



```
TAPE DATA MENU

1 TAPE DATA        <ON >
2 AUTO TITLE       <ON >
3 DELETE   TAPE NO.DATA
4 DISPLAY TAPE NO.DATA

              END  GUIDE
```

[Condition]

A cassette should not be inserted in the VCR (set to eject) .

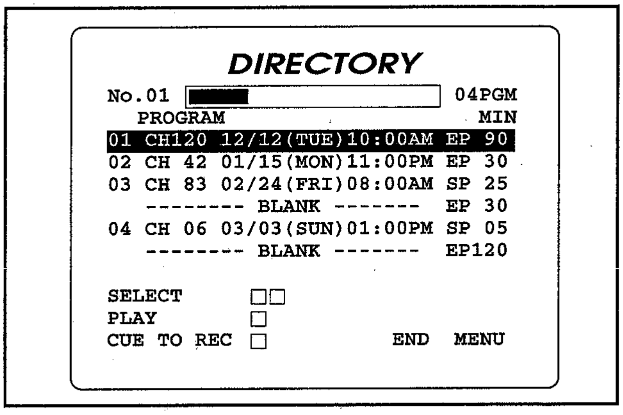
[Operation]

Procedure : Press the TAPE NAVIGATION "MENU" button of the remote control and them, then press the Tape Navigation "MENU" button of the VCR.

Release : Turn the power off or insert a cassette.

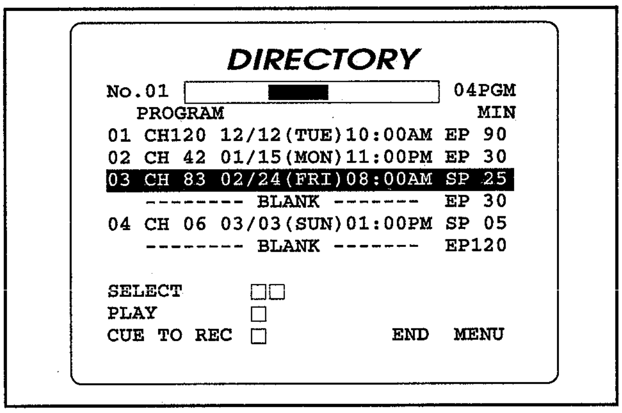
[Action]

1) The tape data screen is displayed (for 40 seconds) .



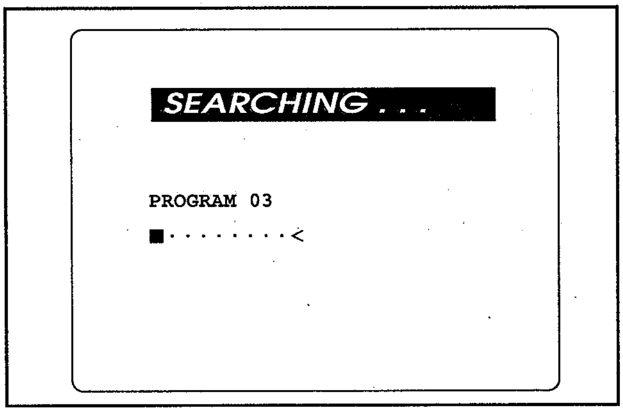
```
              DIRECTORY
No.01                              04PGM
   PROGRAM                           MIN
01 CH120 12/12(TUE)10:00AM EP  90
02 CH 42 01/15(MON)11:00PM EP  30
03 CH 83 02/24(FRI)08:00AM SP  25
   -------- BLANK -------  EP  30
04 CH 06 03/03(SUN)01:00PM SP  05
   -------- BLANK -------  EP120

SELECT      ☐☐
PLAY        ☐
CUE TO REC  ☐           END   MENU
```

2) The cursor moves down to following programs and then moves up to the first program (at intervals of a few seconds) .



```
              DIRECTORY
No.01                              04PGM
   PROGRAM                           MIN
01 CH120 12/12(TUE)10:00AM EP  90
02 CH 42 01/15(MON)11:00PM EP  30
03 CH 83 02/24(FRI)08:00AM SP  25
   -------- BLANK -------  EP  30
04 CH 06 03/03(SUN)01:00PM SP  05
   -------- BLANK -------  EP120

SELECT      ☐☐
PLAY        ☐
CUE TO REC  ☐           END   MENU
```

3) The searching screen is displayed (for 10 seconds) .



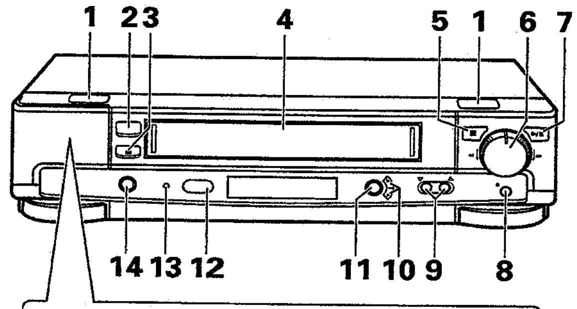
```
SEARCHING . . .

PROGRAM 03
■·········<
```

Steps 1) - 3) are repeated.

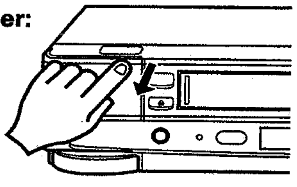
4-4. Instructions on Use

(The following are extracts from the instruction manual.)

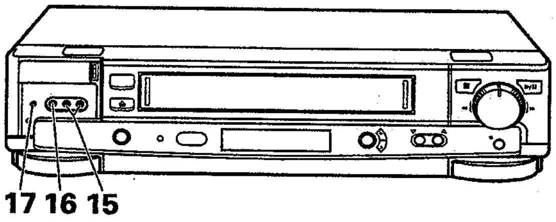
VCR Customer Controls

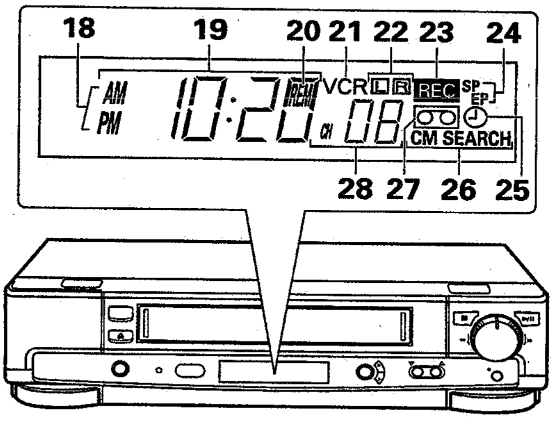


To open the cover:
Pull the cover forward with your fingers.



Behind the cover



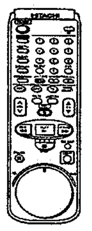


Item No.	Function	Page
1	Infrared transmitter	27
2	POWER button	2
3	EJECT button	9
4	Cassette compartment	9
5	STOP button	25
6	Shuttle ring	38
7	PLAY/STILL button	34
8	REC/IRT button	43
9	CHANNEL (channel up/down)/	43
	TRACKING buttons	33
10	Select button	58
11	MENU button	32
12	Infrared receiver	8
13	REC indicator	43
14	CM SKIP button	36
15	AUDIO IN (L),(R) jacks	65
16	VIDEO IN jack	65
17	ANT. OUT select button	10
	VCR Display	
18	AM/PM indicators	19
19	Time,	19
	Time counter,	40
	Tape remaining or	40
	VCR mode indicator	32
	PLAY — playback	32
	SRCH — double-speed play and visual search "–" appears during reverse direction viewing	34
	SLOW — slow play	—
	REW — rewind	32
	FF — fast forward	—
	STILL — play pause and frame advance	34
20	REM (tape remaining time) indicator	40
21	VCR, operate mode	—
22	Audio indicators	—
23	REC — record (flashes during record pause)	43
24	Tape speed SP/EP	43
25	Delayed recording indicator	49
26	CM SEARCH indicator	43
27	Tape-in indicator	9
28	TV channel or	43
	Auxiliary (L1/L2)	66

Accessories supplied

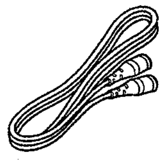
Check and identify the accessories supplied.
If any are missing or appear damaged, consult your dealer.

①



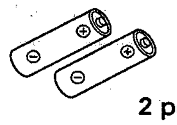
Remote control

②



Cable for connecting this VCR to a TV

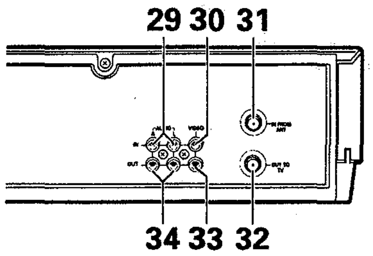
③



2 pcs.

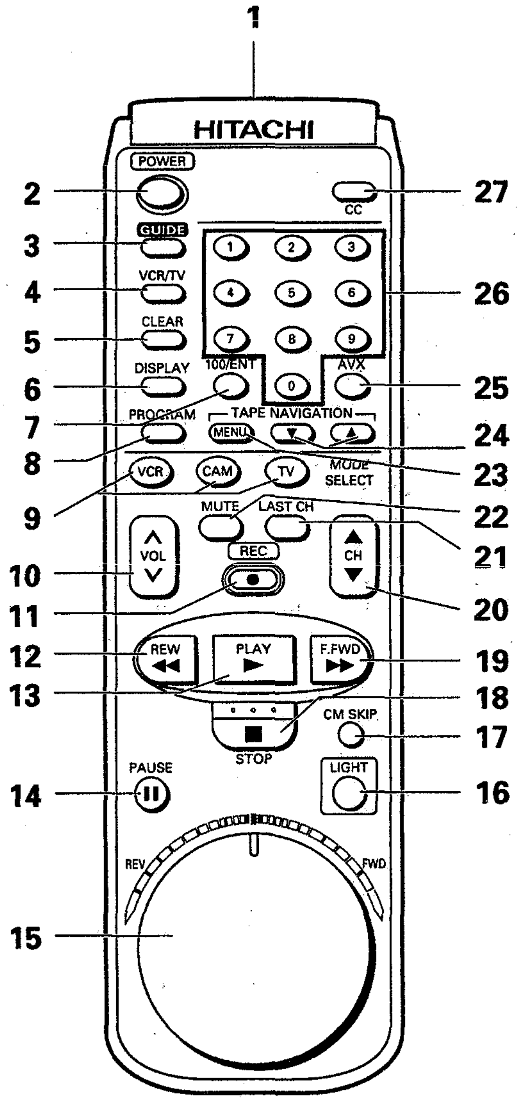
Batteries for remote control handset (R6)

VCR Customer Controls


29 30 31
34 33 32

Item No.	Function	Page
29	AUDIO IN (L), (R) jacks	64
30	VIDEO IN jack	—
31	IN FROM ANT. — signal input	10
32	OUT TO TV — signal out to TV	10
33	VIDEO OUT jack	11
34	AUDIO OUT (L), (R) jacks	11

Remote Control Customer Controls


1
HITACHI
POWER
CC
GUIDE
VCR/TV
CLEAR
DISPLAY
100/ENT
AVX
PROGRAM
TAPE NAVIGATION
MENU
MODE SELECT
VCR
CAM
TV
MUTE
LAST CH
VOL
CH
REC
REW
PLAY
F.FWD
CM SKIP
STOP
PAUSE
LIGHT
REV
FWD
2
3
4
5
6
7
8
9
10
11
12
13
14
15
27
26
25
24
23
22
21
20
19
18
17
16

Item No.	Function	Page
1	Transmission window	8
2	POWER button	24
3	GUIDE — to recall OSD menu	24
4	VCR/TV mode select button	44
5	CLEAR — clears time counter	41
6	DISPLAY — to recall on-screen display	44
7	100/ENT button	43
8	PROGRAM (programming) button	53
9	VCR, CAM (camcorder)*, TV — device buttons let you set the remote to control one of the three devices	8
10	VOL button — increase or decrease the audio volume	63
11	REC — record button	43
12	REW button — fast rewind or search	32
13	PLAY button — playback	25
14	PAUSE button	34
15	Shuttle ring	38
16	LIGHT button — illuminates key function buttons for a few seconds	8
17	CM SKIP button	36
18	STOP button — stops play/record function	25
19	F.FWD button — fast forward or search	34
20	CH (channel up/down) button	43
21	LAST CH button — switches to the TV channel you watched previously during the current viewing session.	63
22	MUTE button — turns off the audio until you press MUTE again	63
23	MENU button	32
24	SELECT button — used to select the program using Tape Navigation	58
25	AVX button — select L1 or L2	64
26	Number buttons	24
27	CC button — used to display captions on the screen	62

* Refer to the camcorder's instruction manual for its operation.

CHAPTER 2 DISASSEMBLY

1. Before Starting Disassembly

1) Unplug the power cord from the AC outlet.
2) [Removal procedure]
   If a special procedure is required when dismantling any component, it is indicated using numbers. Follow the numbers (1), (2), (3) ...) shown in the illustrations.
   [Reinstallation procedure]
   Reinstall each component in the reverse order to removal when otherwise not specified.
3) Insert card connectors securely all the way as they are of the direct insertion type.

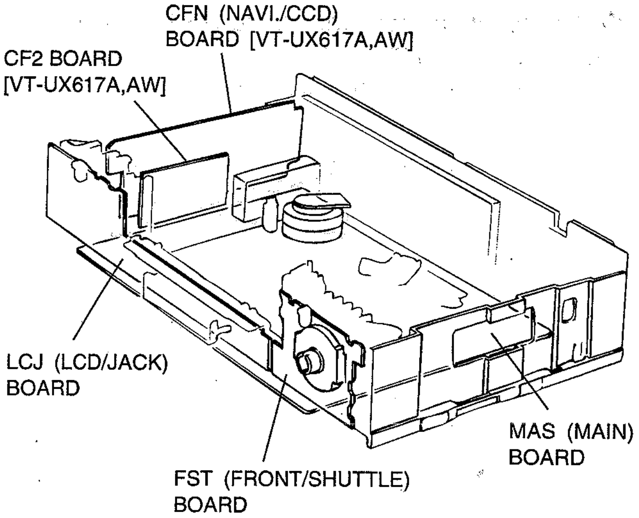

CFN (NAVI./CCD) BOARD [VT-UX617A,AW]
CF2 BOARD [VT-UX617A,AW]
LCJ (LCD/JACK) BOARD
FST (FRONT/SHUTTLE) BOARD
MAS (MAIN) BOARD

Fig. 1-1

2.Disassembly Method

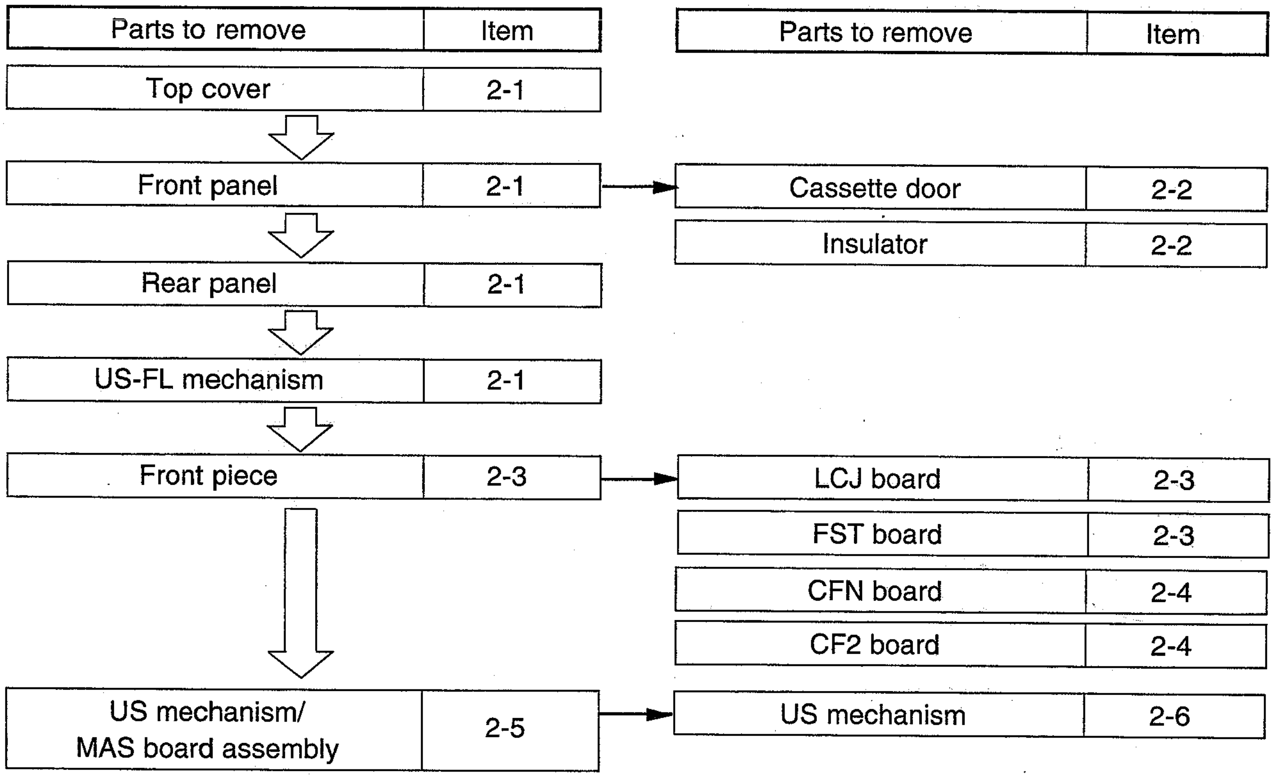
When replacing defective parts, first refer to the "Parts hierarchy chart" shown below.
This chart shows the procedure for parts removal when replacing defective parts.

[How to use the parts hierarchy chart]

(1) Locate the part to be replaced.
(2) Check the parts in the ranks above the part to be replaced and start dismantling.
(3) Replace the defective part and reinstall the parts in the reverse order to that shown in the parts hierarchy chart.

Parts Hierarchy Chart

Note : Dismantle parts in the eject state.

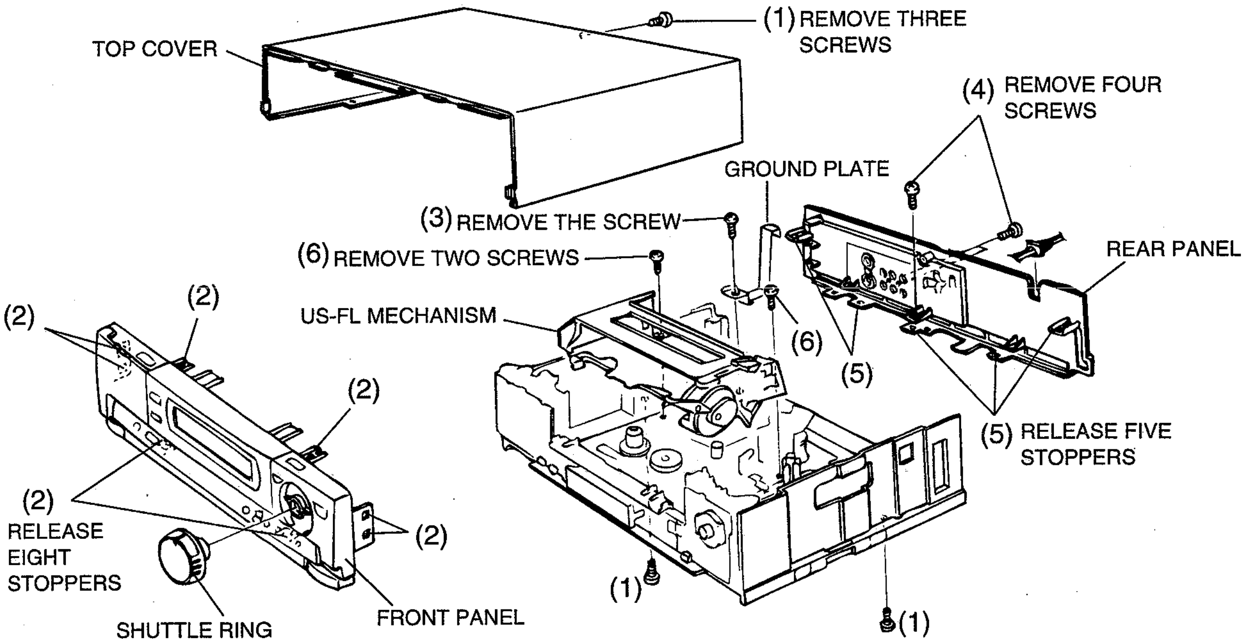

Parts to remove
Item
Parts to remove
Item
Top cover
2-1
Front panel
2-1
Cassette door
2-2
Insulator
2-2
Rear panel
2-1
US-FL mechanism
2-1
Front piece
2-3
LCJ board
2-3
FST board
2-3
CFN board
2-4
CF2 board
2-4
US mechanism/ MAS board assembly
2-5
US mechanism
2-6

Disassembly Procedure Diagrams

Item	Parts to remove
2-1	Top cover, front panel, rear panel and US-FL mechanism

◆ Caution when reinstalling the US-FL mechanism

Reinstall the US-FL mechanism in the state that the cassette holder is pulled forward. (Otherwise, the switch arm could damage the FL switch on the MAS board.)



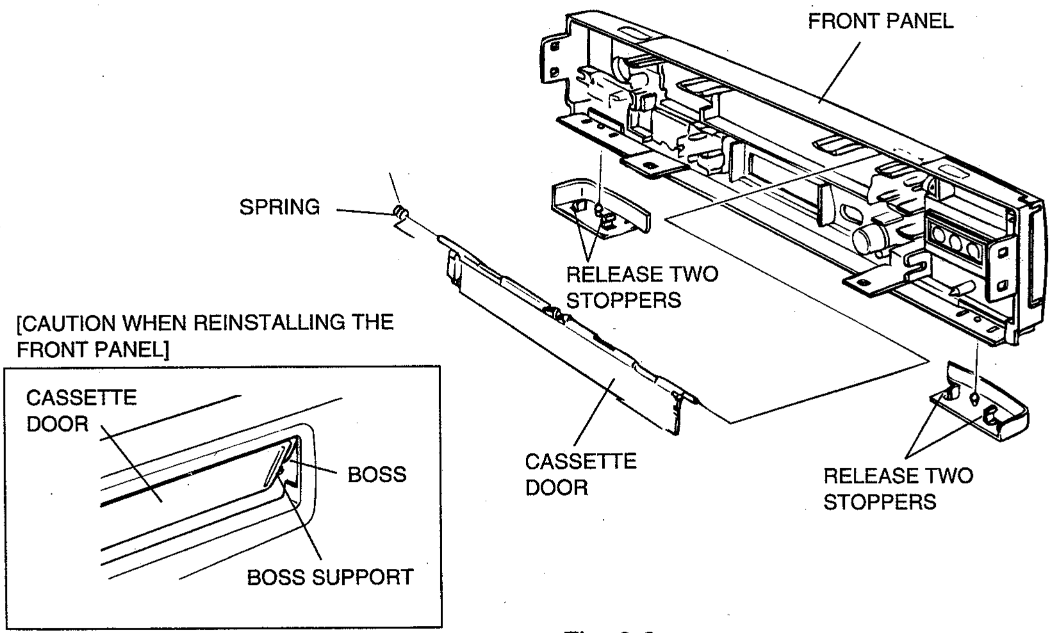
TOP COVER
(1) REMOVE THREE SCREWS
(4) REMOVE FOUR SCREWS
GROUND PLATE
(3) REMOVE THE SCREW
(6) REMOVE TWO SCREWS
REAR PANEL
(2)
(2)
US-FL MECHANISM
(6)
(5)
(2)
(5) RELEASE FIVE STOPPERS
(2) RELEASE EIGHT STOPPERS
(2)
(1)
SHUTTLE RING
FRONT PANEL
(1)

Fig. 2-1

2-2	Cassette door and insulator

◆ Caution when reinstalling the front panel

Reinstall the front panel in the state the cassette door is pushed so the boss of the door arm comes to the front of the boss support of the cassette door.



FRONT PANEL
SPRING
RELEASE TWO STOPPERS
[CAUTION WHEN REINSTALLING THE FRONT PANEL]
CASSETTE DOOR
BOSS
BOSS SUPPORT
CASSETTE DOOR
RELEASE TWO STOPPERS

Fig. 2-2

Item	Parts to remove
2-3	Front piece, LCJ board and FST board

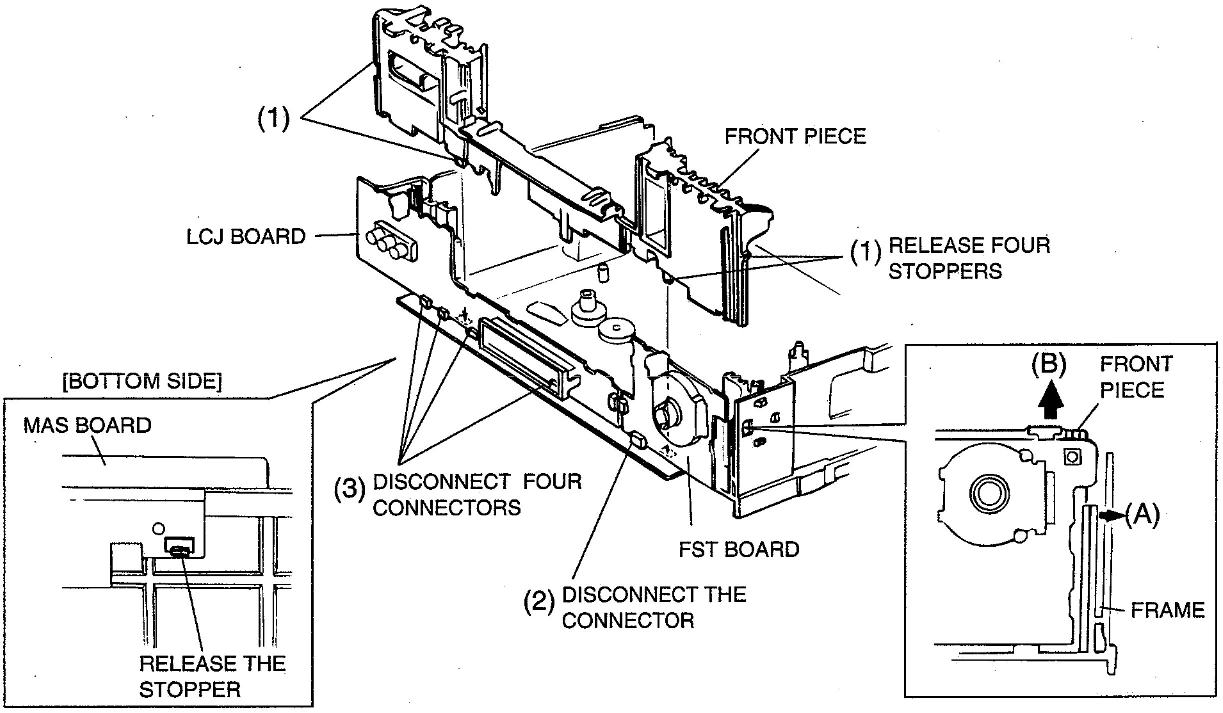

(1)
FRONT PIECE
LCJ BOARD
(1) RELEASE FOUR STOPPERS
[BOTTOM SIDE]
MAS BOARD
RELEASE THE STOPPER
(3) DISCONNECT FOUR CONNECTORS
FST BOARD
(2) DISCONNECT THE CONNECTOR
(B)
FRONT PIECE
(A)
FRAME

Fig. 2-3

2-4	CFN,CF2 boards [VT-UX617A,AW]	2-5	US mechanism/MAS board assembly

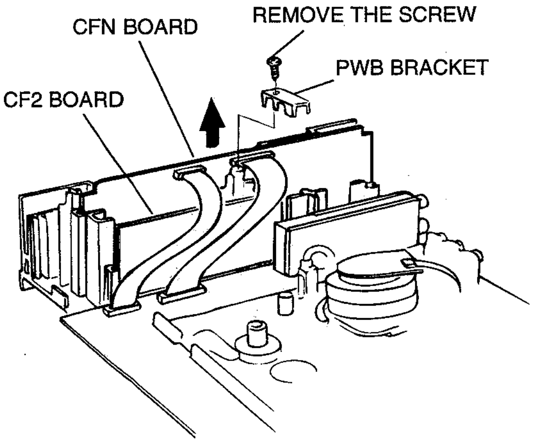

CFN BOARD
REMOVE THE SCREW
PWB BRACKET
CF2 BOARD

Fig. 2-4

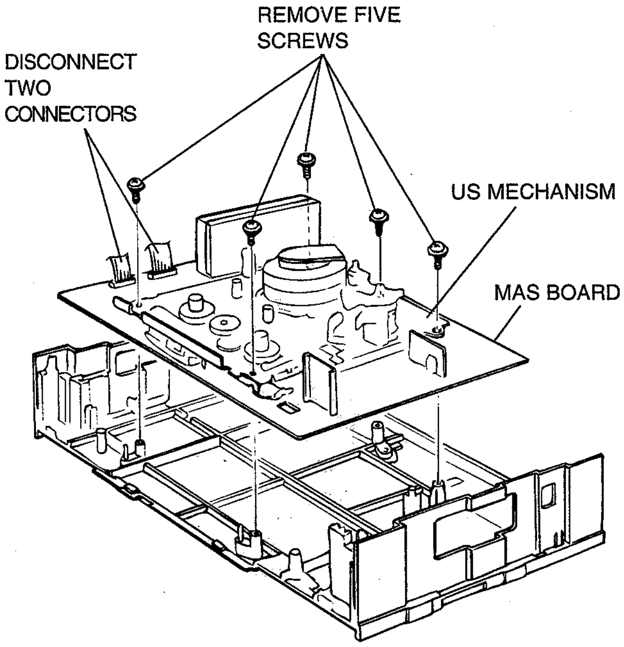

REMOVE FIVE SCREWS
DISCONNECT TWO CONNECTORS
US MECHANISM
MAS BOARD

Fig. 2-5

Item	Parts to remove
2-6	Separation of MAS board from US mechanism

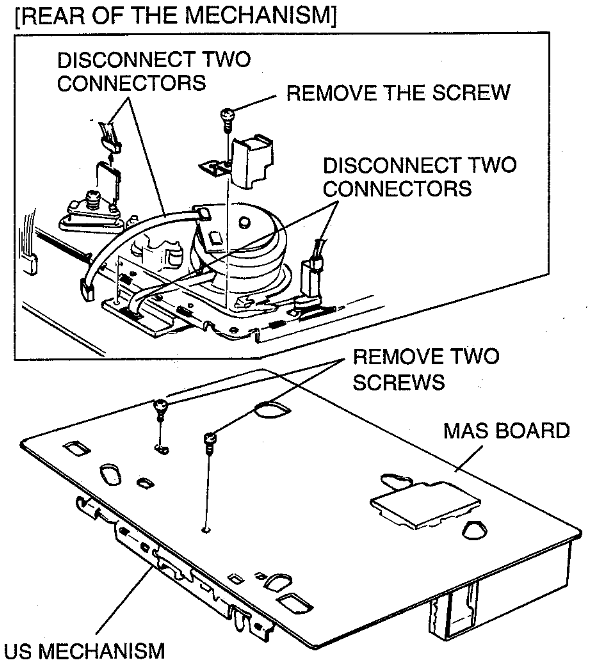

[REAR OF THE MECHANISM]
DISCONNECT TWO CONNECTORS
REMOVE THE SCREW
DISCONNECT TWO CONNECTORS
REMOVE TWO SCREWS
MAS BOARD
US MECHANISM

Fig. 2-6

Procedure to remove only the US mechanism

With this VCR the US mechanism can be removed without removing the MAS board. This is done by a different method from the normal disassembly method.

Parts to remove	Item
Top, Front and Rear panel	2-1
⇩	
US-FL mechanism	2-1
⇩	
Remove two screws on the bottom of the VCR.	2-7
⇩	
Remove five screws holding the US mechanism.	2-7
⇩	
Disconnect the connectors on the US mechanism and lift the mechanism.	

Item	Parts to remove
2-7	Procedure to remove only the US mechanism

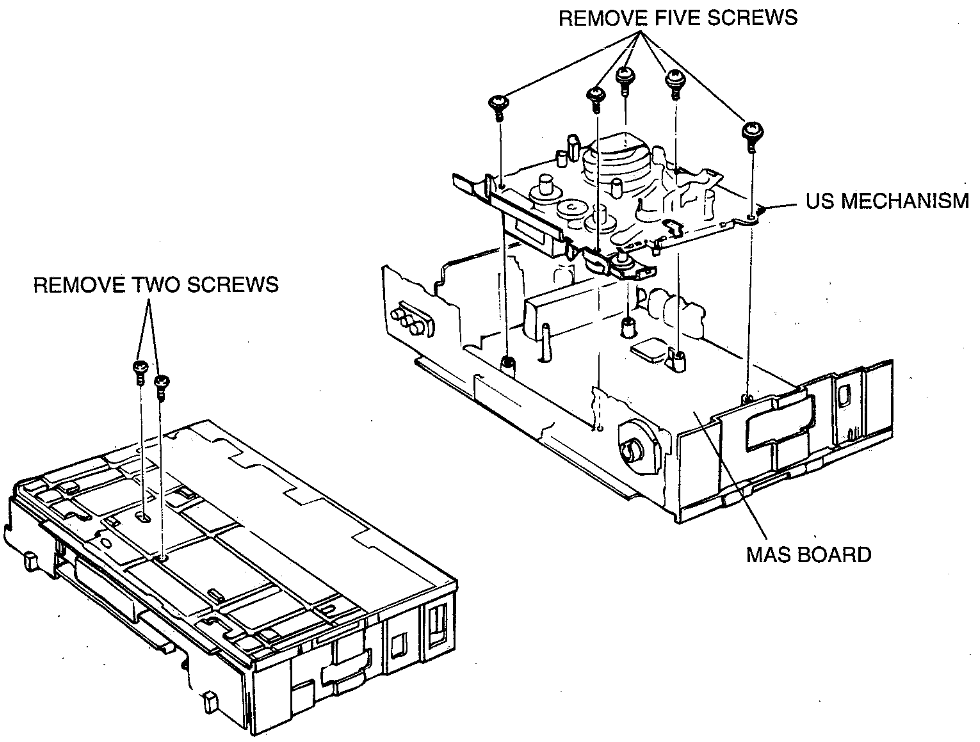

REMOVE FIVE SCREWS
US MECHANISM
REMOVE TWO SCREWS
MAS BOARD

Fig. 2-7

3. Cautions When Reinstalling the US Mechanism

This VCR has mechanism sensors on the MAS board and the capstan and loading motors are connected via direct connectors. Therefore, when reinstalling the US mechanism, observe the following cautions.

1) Align the ▽ mark and mode no. 1 of the mechanism state switch on the MAS board. (Mode no. 1 of the mechanism state switch has a click position.)

2) Check that mode no. 1 on the P drive gear in the mechanism and the ▽ mark of the spring hook are aligned. If they are not aligned, turn the loading motor pulley to align them.

3) Pass the end LED through the hole in the mechanism and install the mechanism from immediately above using the installation position holes as reference. Check that the boss of the mechanism state switch and the hole in the cam gear are aligned.

4) Push the terminal sections (shaded sections ▨) of the capstan and loading motors and check that they are inserted securely.

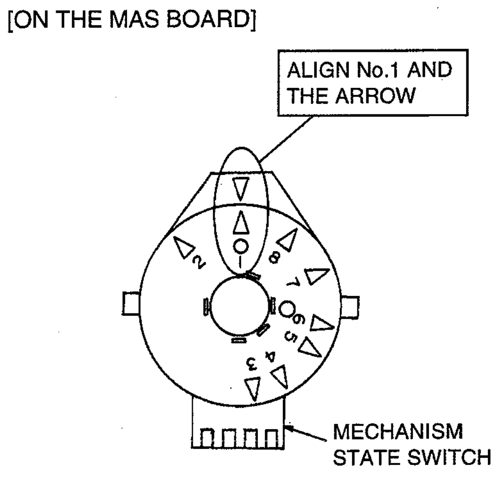

[ON THE MAS BOARD]
ALIGN No.1 AND THE ARROW
1
2
3
4
5
6
7
8
MECHANISM STATE SWITCH

Fig. 3-1

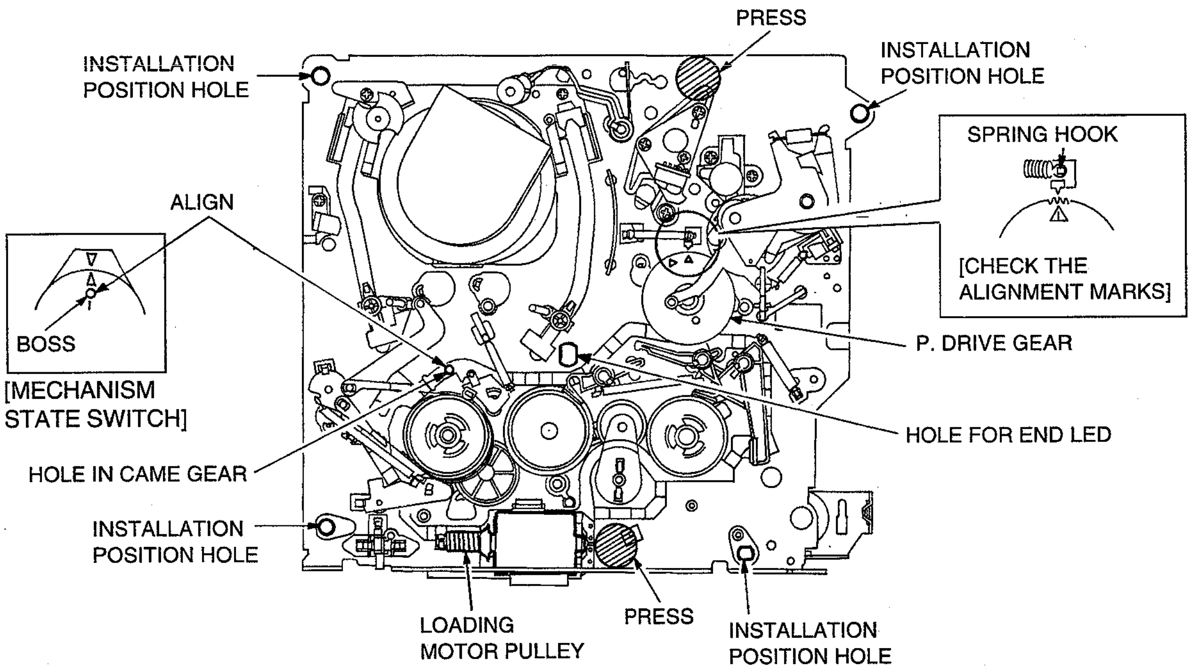

PRESS
INSTALLATION POSITION HOLE
INSTALLATION POSITION HOLE
SPRING HOOK
[CHECK THE ALIGNMENT MARKS]
ALIGN
BOSS
[MECHANISM STATE SWITCH]
P. DRIVE GEAR
HOLE FOR END LED
HOLE IN CAME GEAR
INSTALLATION POSITION HOLE
LOADING MOTOR PULLEY
PRESS
INSTALLATION POSITION HOLE

Fig. 3-2

MEMO

CHAPTER 3 ELECTRIC CIRCUIT ADJUSTMENT

◆ Service Position

1. Servicing position during electrical adjustment

Perform adjustment after removing the top cover, front panel and rear panel.

When the shield cover of the connector between the cylinder motor and MAS boards is removed, noise appears in the playback picture. Attach the shield cover when checking the picture on the screen.

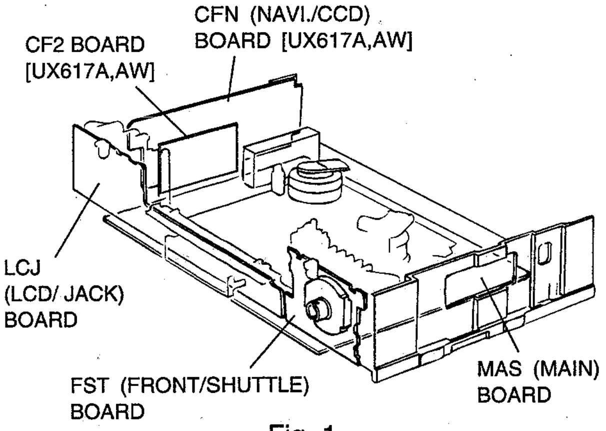

CFN (NAVI./CCD) BOARD [UX617A,AW]
CF2 BOARD [UX617A,AW]
LCJ (LCD/ JACK) BOARD
FST (FRONT/SHUTTLE) BOARD
MAS (MAIN) BOARD

Fig. 1

2. Servicing positions when repairing and checking circuits

2-1. Procedure to set the LCJ, FST and CFN boards to the servicing positions (Fig. 2)

1) Remove the top cover and front panel.
2) Remove the rear panel.
3) Remove the US-FL mechanism.
4) Remove the front piece.
5) Open each board as shown in the figure below and perform checks from the pattern sides indicated by the arrows.

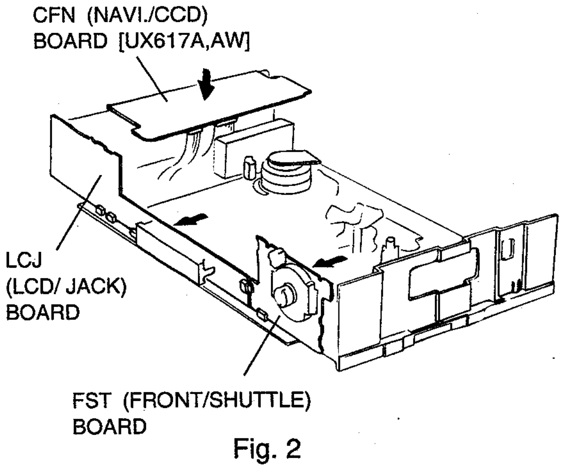

CFN (NAVI./CCD) BOARD [UX617A,AW]
LCJ (LCD/ JACK) BOARD
FST (FRONT/SHUTTLE) BOARD

Fig. 2

2-2. Procedure to set the MAS board to the servicing position (Fig. 3)

1) Remove the top cover and front panel.
2) Remove the rear panel.
3) Remove the US-FL mechanism and front piece.
4) Remove the MAS board, with the LCJ and FST boards and US mechanism assembled from the frame.
5) Turn over the MAS board and perform checks from the pattern side indicated by the arrow.

Note the following two points at this time.

1) Lay an insulation sheet under the boards.
2) Attach the shield cover at the rear of the cylinder. Attach the US-FL mechanism when loading the tape.

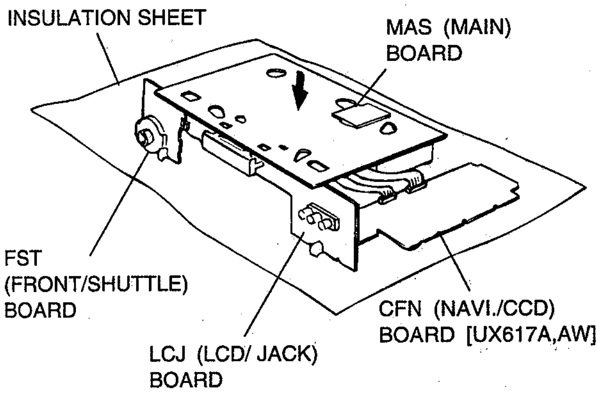

INSULATION SHEET
MAS (MAIN) BOARD
FST (FRONT/SHUTTLE) BOARD
CFN (NAVI./CCD) BOARD [UX617A,AW]
LCJ (LCD/ JACK) BOARD

Fig. 3

3. Be careful of electric shocks

The power supply block on the right of the VCR has a heat sink which generates a high voltage. "HIGH VOLTAGE" is printed on the heat sink.

Take great care when handling this heat sink when the power is turned on during servicing.

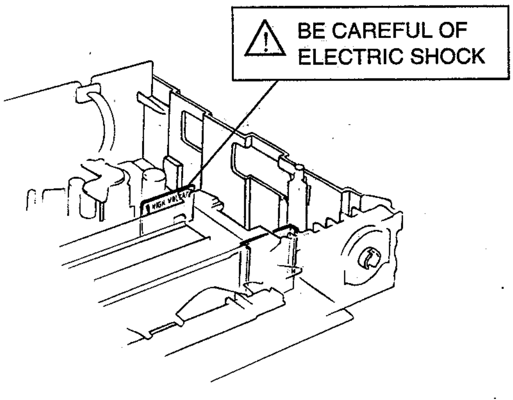

⚠ BE CAREFUL OF ELECTRIC SHOCK

Fig. 4

Electrical Circuit Adjustment

1. Test equipment/jigs necessary for adjustment

1) Dual-trace oscilloscope
2) Color bar generator
3) Voltmeter
4) Monitor TV (with A/V jacks)
5) Alignment tapes :

NTSC tape	:	Part No. 7099046
30HMP2-1	:	Part No. 7099089
24HMAF-2	:	Part No. 7099153 (Hi-Fi alignment tape)

6) Blank tape
7) C/R oscillator

2. Cautions on adjustment

1) The following conditions apply when otherwise not specified.
   Probe of oscilloscope : 10 : 1
   Synchronization of oscilloscope : Internal sync
   Ground of test equipment : PG2508 pin 6 (on MAS board)
2) When performing more than one adjustment, follow the specified order.

3. Tips for adjustment

3-1. Procedure to reset the main microprocessor

The main microprocessor is not reset even when the power cord is unplugged from the AC outlet because its power is backed up by a backup circuit. Press S1719 on the LCJ board to reset the entire microprocessor. Do not press the reset switch with the power cord unplugged from the AC outlet as the slow tracking preset value could drift. If the preset value drifts, plug the power cord into an AC outlet and press the reset switch again with the power turned on. It is recommended that you press the reset switch after reinstalling the front panel.

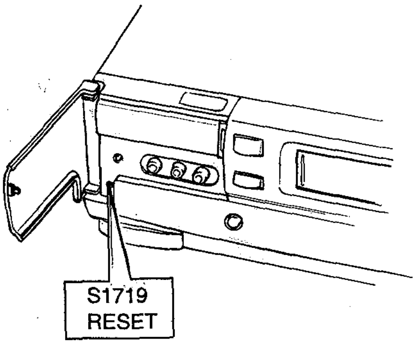


Fig. 5

3-2. Procedure to switch off the blue background function

1) Press the "GUIDE" button of the remote control to display the menu on the monitor TV screen.
2) Press "2" to select the VCR setup screen.
3) Press "1" to specify blue background off.

3-3. Procedure to obtain the EP head playback mode (X-value adjustment test mode)

Press the "1" and "4" buttons of the remote control provided simultaneously when an alignment tape is being played and hold them, then press the "CHANNEL ▽ " button on the VCR ; The VCR enters the EP head playback mode (X-value adjustment test mode) .
Check that "**TEST**" appears in the LCD display.

4. Connections of test equipment

Connect the test equipment as follows when otherwise not specified.

1) Connect a color bar generator to the video input 1 jack of the VCR.
2) Connect a monitor TV to the video output 1 jack of the VCR.
3) Connect a monitor TV (able to handle a stereo signal) to the audio output 1 jack.
4) Connect an antenna to the antenna jack and receive a TV broadcast (only for sound multiplex adjustment) .

5. Test Points and Adjustment Points

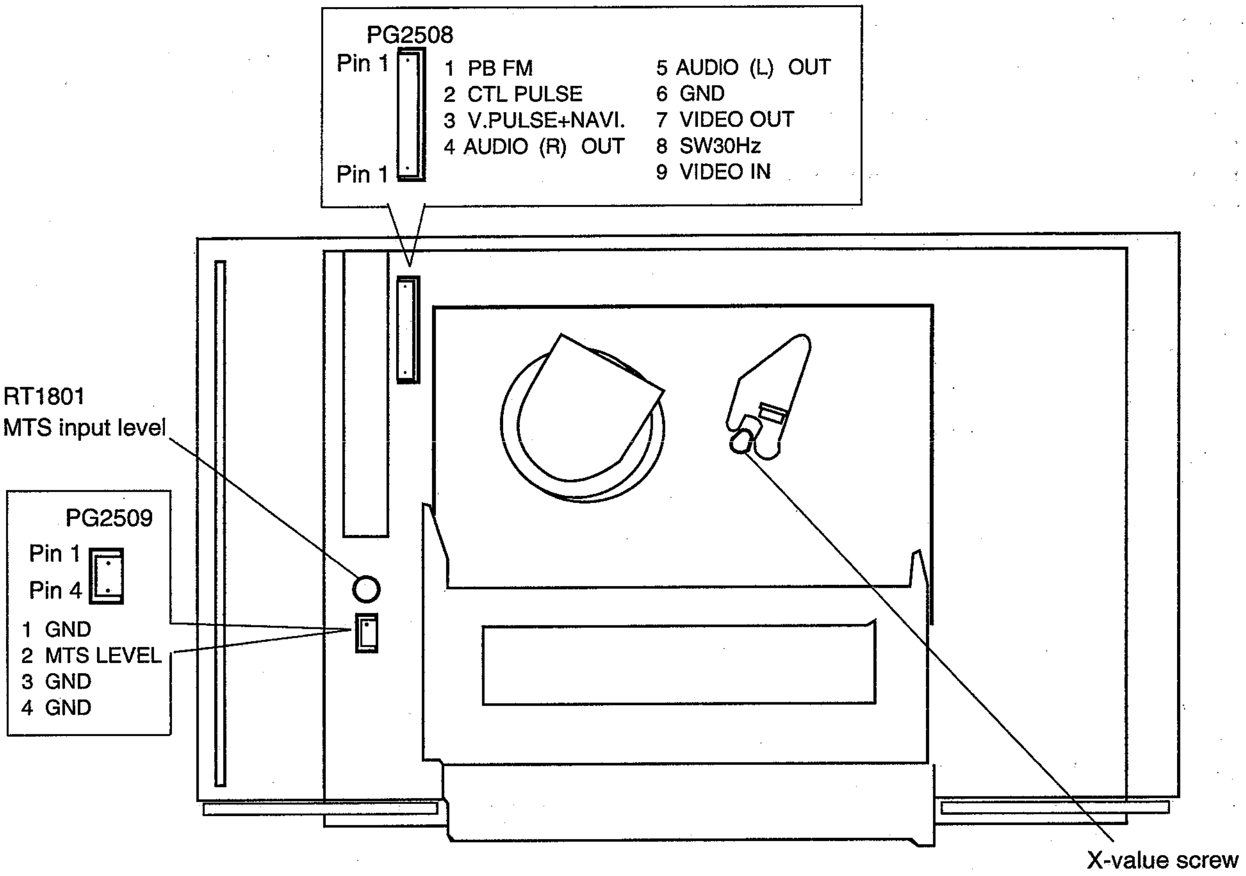

PG2508
Pin 1
Pin 1
1 PB FM
2 CTL PULSE
3 V.PULSE+NAVI.
4 AUDIO (R) OUT
5 AUDIO (L) OUT
6 GND
7 VIDEO OUT
8 SW30Hz
9 VIDEO IN
RT1801
MTS input level
PG2509
Pin 1
Pin 4
1 GND
2 MTS LEVEL
3 GND
4 GND
X-value screw

Fig. 6 MAS (Main) Circuit Board 〔Components Side〕

The remote control provided with this VCR does not have a tracking button. The "CH-UP" and "CH-DOWN" buttons operate as the tracking controls during playback.

6. Servo Circuit Adjustments

6-1. Switching point adjustment (Fig. 6)

Purpose :

To set the switching point of the video heads during playback to the center where the CH-1 and CH-2 envelopes overlap each other.

Fault due to incomplete adjustment :

Vertical sync signal is degraded and vertical jitter occurs.

Switching noise appears across the bottom of the screen.

Test Equipment/Jigs and Connection Points

Oscilloscope	CH-1 :	Video out jack
	CH-2 :	PG2508-8 (SW30Hz)
Alignment tape	(30HMP2-1)	

State of VCR

1) Play the alignment tape
2) Set to the X-value adjustment test mode.

Adjustment Point

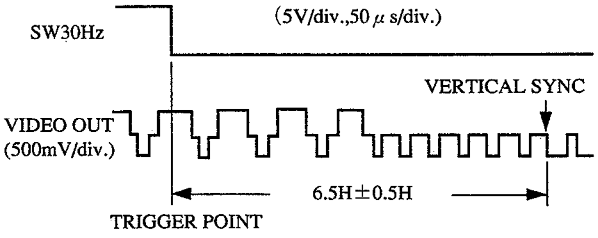
F.FWD button (remote control)

REW button (remote control)

Adjustment Procedure

1) Play the alignment tape.
2) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽" (S2709) button of the VCR to set the VCR to the test mode. (Check that "TEST" appears in the display.)
3) Press the "F.FWD"and "REW" buttons of the remote control so the phase from the vertical sync to the trailing edge (trigger position) of the SW30Hz pulse is set to 6.5H ± 0.5H.
4) Press the "STOP" button to release the test mode.

Waveforms



<Conditions of oscilloscope>

Trigger with CH-2.

Set the sync slope to "-".

6-2. X-value adjustment (Fig. 6)

Purpose :

To ensure compatibility with other VCRs.

Fault due to incomplete adjustment :

When a tape recorded by another VCR is played back, the tracking is not optimized and noise appears on the screen.

Test Equipment/Jigs and Connection Points

Oscilloscope	CH-1 :	PG2508-1 (PB FM)
	CH-2 :	PG2508-8 (SW30Hz)
Alignment tape	(30HMP2-1)	

State of VCR

1) Play the alignment tape.
2) Set to the X-value adjustment test mode.

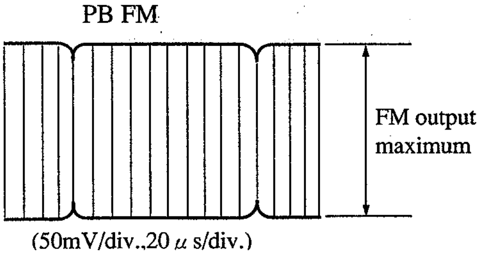
Adjustment Point

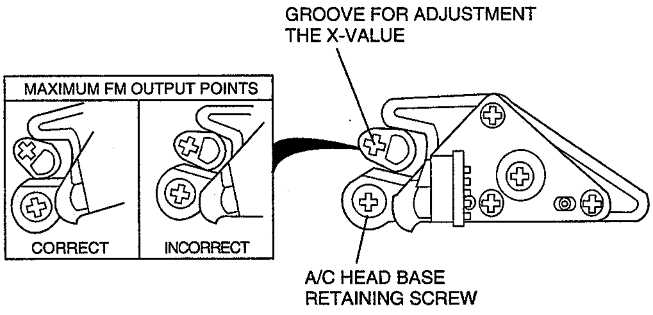
Groove for the adjustment X-value

Adjustment Procedure

1) Play the alignment tape.
2) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽" (S2709) button of the VCR to set the VCR to the test mode. (Check that "TEST" appears in the display.)
3) Loosen the screw holding the A/C head base (do not loosen it excessively) .
4) Insert a screwdriver into the groove for adjusting the X-value and adjust so the FM output is maximum. There are two maximum FM output points when the groove for adjusting the X-value is turned. Adjust the FM output to a maximum when the groove is at the correct position as shown in the figure below.
5) Press the "STOP" button to release the test mode.

Waveforms





6-3. Vertical jitter adjustment

Purpose :

To suppress vertical jitter during slow and still play.

Fault due to incomplete adjustment :

Vertical jitter appears in the picture during slow and still play.

Test Equipment/Jigs and Connection Points

Monitor TV : Video output jack
Color bar generator : Video input jack
Blank tape

State of VCR

Record a color bar signal and play it using the same VCR.

Adjustment Point

CHANNEL △ (S2708)
CHANNEL ▽ (S2709)

Adjustment Procedure

<EP vertical jitter correction> : Record in the EP mode and play it back using the same VCR.

1) Press the "PAUSE" button to set the VCR to the still play mode.
2) Use the CHANNEL buttons of the VCR to suppress vertical jitter of the picture.

<SP vertical jitter correction> : Record in the SP mode and play it back using the same VCR.

1) Press the "PAUSE" button to set the VCR to the still play mode.
2) Use the CHANNEL buttons of the VCR to suppress vertical jitter in the picture.

6-4. Forward slow tracking preset adjustment

Purpose :

To adjust the timing with which the brake pulse of the capstan motor is generated during slow play so that noise is minimum.

Fault due to incomplete adjustment :

Noise appears during slow play and the picture is not clear.

Test Equipment/Jigs and Connection Points

Monitor TV : Video output jack
Color bar generator : Video input jack
Blank tape (T-120)

State of VCR

Slow tracking : Unplug the power cord to set the slow tracking to the center.

Adjustment Point

CHANNEL △ (S2708)
CHANNEL ▽ (S2709)

Adjustment Procedure

1) Record a signal on the middle of a T-120 blank tape in the EP mode and play it back using the same VCR.
2) Press the "1" and "4" buttons of the remote control (provided) simultaneously during playback and hold them, then press the "PLAY" button (S2701) to set the VCR to the forward test slow mode.
3) Use the CHANNEL buttons so the slow feed noise appears across the bottom of the monitor screen and then it is driven out from the bottom of the screen.
4) Check that no noise appears on the monitor screen.
5) Press the "PLAY" button to return the VCR to the playback mode (the preset data is written to the EEPROM) .
6) Perform the same procedure to perform slow tracking preset adjustment in the SP mode.
Do not press the reset switch after adjustment when the power is not turned on as the preset value could drift. If the preset value drifts, turn the power on and press the reset switch again for recovery.

6-4. Reverse slow tracking preset adjustment

Purpose :

To adjust the timing with which the brake pulse of the capstan motor is generated during reverse slow play so that noise is minimum.

Fault due to incomplete adjustment :

Noise appears during reverse slow play and the picture is not clear.

Test Equipment/Jigs and Connection Points

Monitor TV : Video output jack
Color bar generator : Video input jack
Blank tape (T-120)

State of VCR

Slow tracking : Unplug the power cord to set the slow tracking to the center.

Adjustment Point

CHANNEL △ (S2708)
CHANNEL ▽ (S2709)

Adjustment Procedure

1) Record a signal on the middle of a T-120 blank tape in the EP mode and play it back using the same VCR.
2) Press the "1" and "4" buttons of the remote control (provided) simultaneously during still play and hold them, then press the "PLAY" button (S2701) to set the VCR to the reverse test slow mode.
3) Use the CHANNEL buttons so the slow feed noise appears across the bottom of the monitor screen and then it is driven out from the bottom of the screen.
4) Check that no noise appears on the monitor screen.
5) Press the "PLAY" button to return the VCR to the playback mode (the preset data is written to the EEPROM) .
6) Perform the same procedure to perform reverse slow tracking preset adjustment in the SP mode.
Do not press the reset switch after adjustment when the power is not turned on as the preset value could drift. If the preset value drifts, turn the power on and press the reset switch again for recovery.

7. Audio/MTS Circuit Adjustments

7-1. Hi-Fi audio playback level check

Purpose :

To set the playback level of the Hi-Fi audio signal to the specified value.

Fault due to incomplete adjustment :

The appropriate volume cannot be obtained during playback.

Test Equipment/Jigs and Connection Points

Voltmeter

When checking L-CH : Audio output (L) jack
When checking R-CH : Audio output (R) jack

Hi-Fi alignment tape (24HMAF-2)

State of VCR

Play Hi-Fi alignment tape.

Adjustment procedure

Use the same checking procedure for both the L and R channels.
Check that the voltmeter reads -7.8dBs ± 3.0dBs.
If it cannot be confirmed, check the playback signal system.

7-2. MTS input level adjustment

Purpose :

To set the level of the MTS signal supplied to the MTS processor in IC1801 from the tuner/IF to the specified level.

Fault due to incomplete adjustment :

1) The S/N deteriorates or distortion becomes conspicuous.
2) Stereo separation deteriorates.

Test Equipment/Jigs and Connection Points

MTS sound signal generator : IN FORM ANT
Voltmeter : PG2509-2

State of VCR

E-E mode

Adjustment Point

RT1801

Adjustment procedure

1) RT1801 : Set the reading of the voltmeter to -20.0dBs ± 0.2dBs.

Notes :

MTS sound signal generator settings :

1) Audio frequency : 300Hz
2) Modulation signal : L+R

Monitor TV settings :

1) Press the "GUIDE" button of the remote control to display the menu on the monitor TV screen.
2) Press "2" of the remote control.
3) Press "6" of the remote control to select the SAP option and switch it from OFF to ON.

8. List of Data in EEPROMs and Initial Settings

The table below lists the data stored in each ROM. It also shows the data set by shipment mode initialization, when the tape navigation map data is initialized and when the trouble display is cleared.

Information	Data memory ROMs		List of initial data		
	IC903 VCR EEPROM	IC4402 NAVI EEPROM	Shipment mode initial data	Tape nevi. map initial deta	Clearing of trouble display
Tuned channel data	Yes	No	No	No	No
Auto clock channel data	Yes	No	Yes	No	No
VCR mode select data	Yes	No	Yes	No	No
Cable box/DSS box type	Yes	No	Yes	No	No
Trouble display data	Yes	No	Yes	No	Yes
Slow tracking data	Yes	No	No (set by adj.)	No	No
Artificial V sync data	Yes	No	No (set by adj.)	No	No
Switching point data	Yes	No	No (set by adj.)	No	No
Tape navigation map data	No	Yes	No	Yes	No

9. List of Hidden Commands

The following tables list the mode setting commands during adjustment and EEPROM initial setting commands.

9-1. Mode setting commands during adjustment

Item	Mode in which command is accepted	Operation	Remarks
Tracking center	Play	Press the "TRACKING △ " and " ▽ " buttons on the VCR or the "CH ▲ " and "CH ▼ " buttons of the remote control simultaneously.	
X-value adjustment test mode	Play	Press the "1" and "4" buttons of the remote control simultaneously and press the "CHANNEL ▽ " button on the VCR.	"tESt" appears
Forward test slow mode	Play	Press the "1" and "4" buttons of the remote control simultaneously and press the "PLAY" button on the VCR.	"SLOW" appears
Reverse test slow mode	Still play	Press the "1" and "4" buttons of the remote control simultaneously and press the "PLAY" button on the VCR.	"-SLOW" appears

9-2. EEPROM initialization commands

Item	Mode in which command is accepted	Operation	Remarks
Shipment mode initial setting	EJECT	Press the "REC" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "REC" button depressed and release it after the display lights.
Tape map data initialization	EJECT	Press the "TAPE NAVIGATION-MENU" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "NAVIGATION-MENU" button depressed and release it after the display lights.
Clearing of trouble display	———	Press the "PLAY" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "PLAY" button depressed and release it after the display lights.

10. Initial Settings of IC903 (EEPROM)

The following shows the on-screen display and modes of switches when IC903 (EEPROM) is initialized.

[A] VCR SETUP MENU (in menu)

1 AUTO BLUE	[ON]
4 AUDIO SETUP	[Hi-Fi]
5 AUDIO SETUP	[STEREO]
6 AUDIO SETUP	[SAP OFF]

[B] CLOCK SET (in menu)

1 CLOCK SET	[AUTO]
3 SET TIME ZONE	[AUTO]
4 SET D.S.T	[AUTO]

[C] CHANNEL PRESET (in menu)

1 CHANNEL	[CATV1]

[D] TAPE DATA MENU (in menu) [UX617A,AW]

1 TAPE DATA	[ON]
2 AUTO TITLE	[ON]

[E] COMMERCIAL ADVANCE (in menu) [UX617A,AW]

1 CM SEARCH	[ON]
2 CM ADV. PLAY	[AUTO]
3 CM ADV. DISPLAY	[AUTO]

[F] Other modes

Recording speed : EP

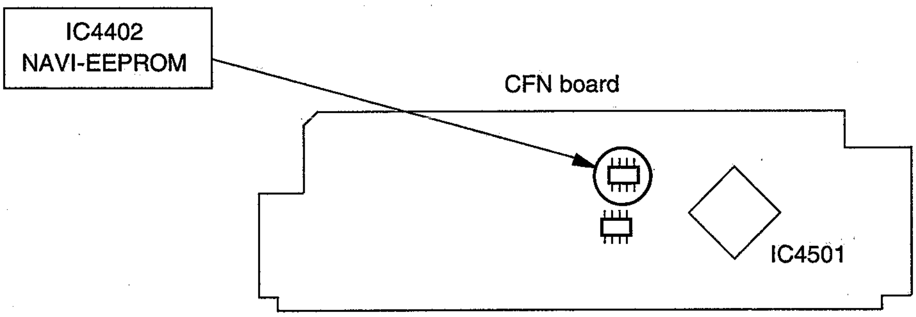
[G] Front panel switch

ANT. OUT : RF-3

11. Caution When Handling IC4402 (NAVI EEPROM) [VT-UX617A,AW]

The navigation map data of the tapes on which the customer has made recordings is stored in IC4402 (NAVI EEPROM) . When the CFN board is replaced, etc. during servicing, remove the ROM from the new board and install the ROM from the repaired product. Do not initialize the tape map information at this time.

Caution : Do not initialize the tape map data except when replacing IC4402 (NAVI EEPROM) due to a defect, etc. in this memory IC. Otherwise the tape navigation data stored by the customer will be erased.



12. Caution When Replacing IC903 (VCR EEPROM)

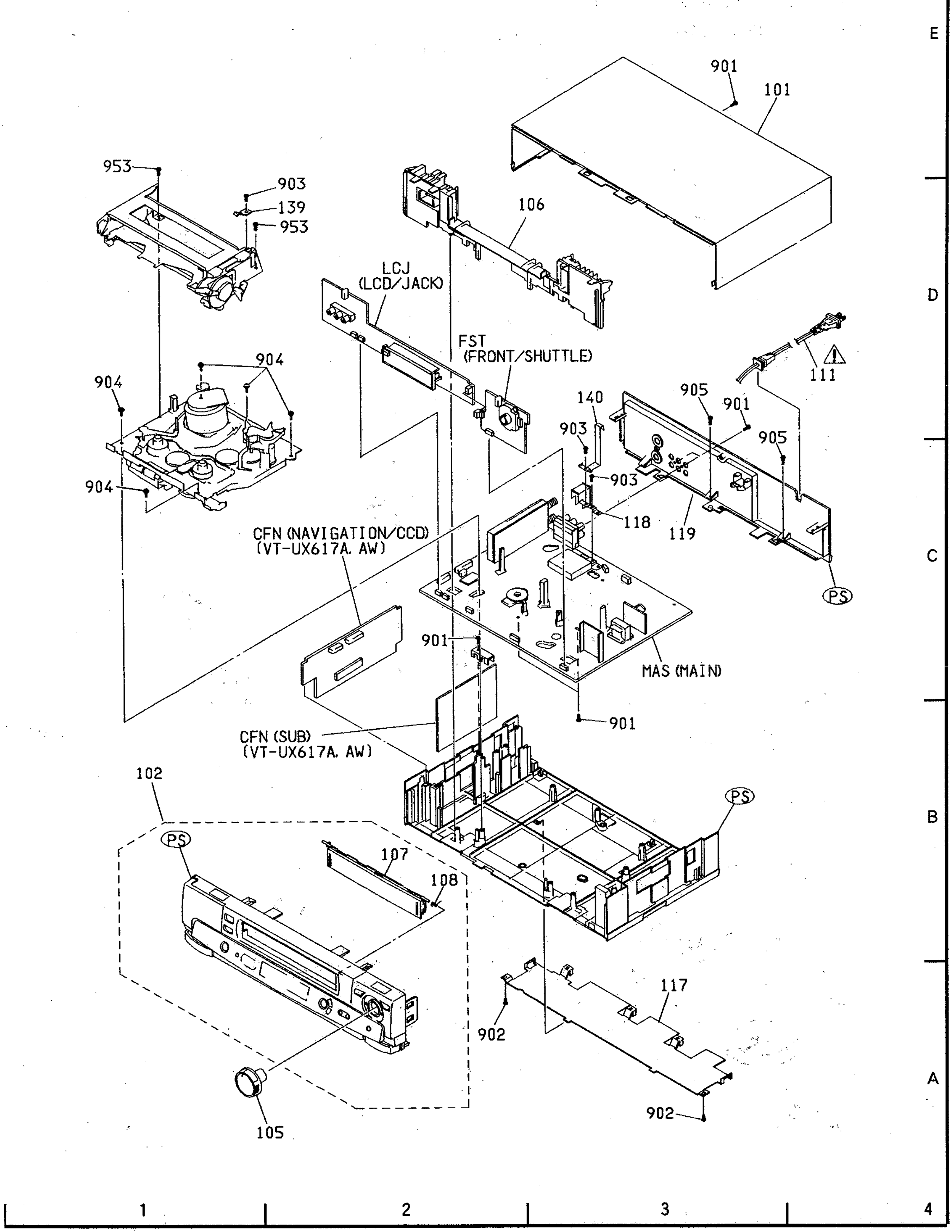
After replacing IC903 (VCR EEPROM) , execute the VCR initial settings and then perform the following adjustments.

	Adjustment	Page
1	Vertical jitter adjustment	P3-5
2	Forward slow tracking adjustment	P3-5
3	Reverse slow tracking adjustment	P3-5

CHAPTER 4 EXPLODED VIEW

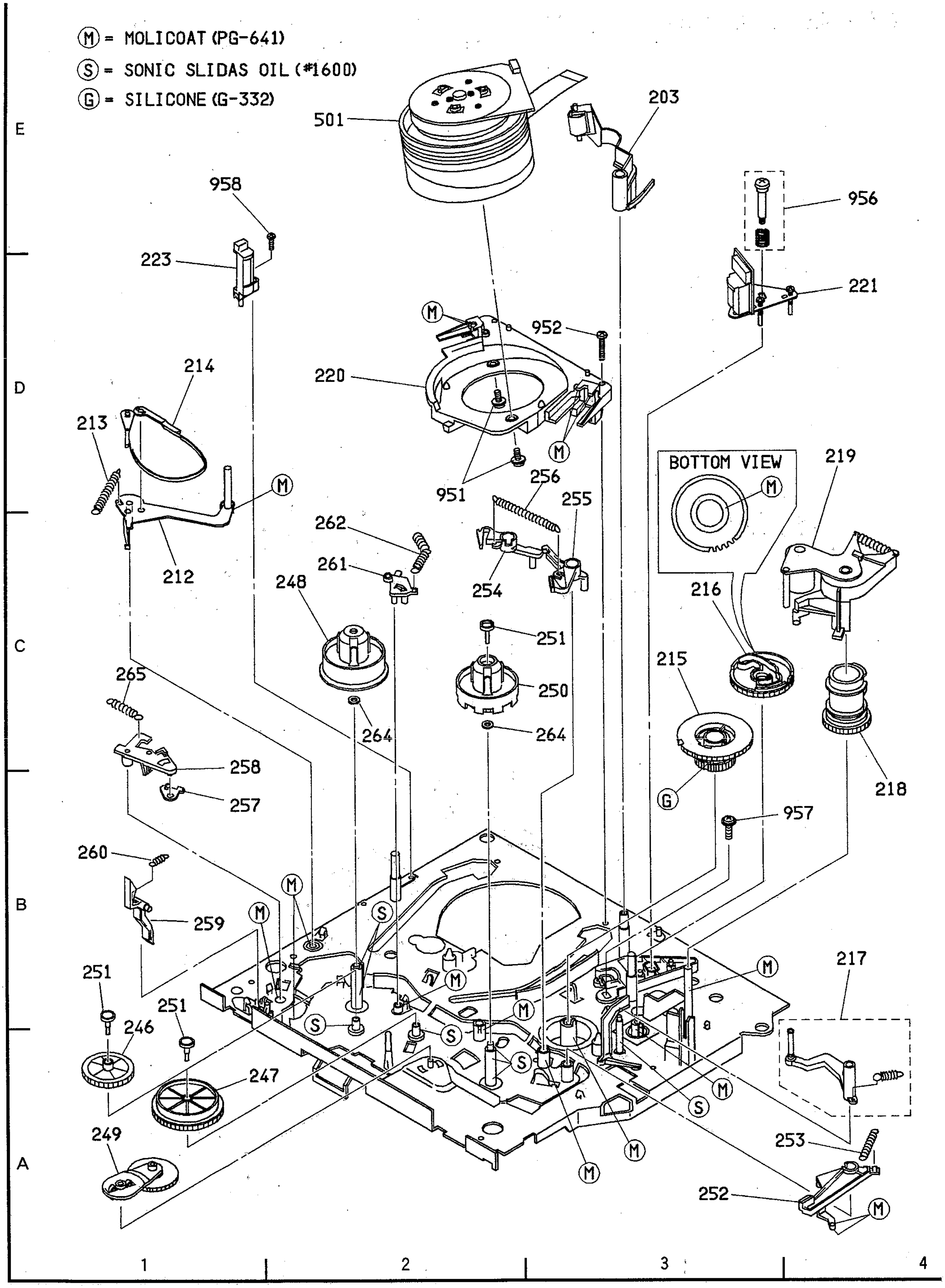
1. CABINET SECTION

NOTE : The synthetic resin members that can be dismantled are shown by abbreviations using letters.


901
101
953
903
139
953
106
LCJ
(LCD/JACK)
FST
(FRONT/SHUTTLE)
904
904
904
140
905
901
111
903
905
903
118
119
904
CFN (NAVIGATION/CCD)
(VT-UX617A. AW)
PS
901
MAS (MAIN)
901
CFN (SUB)
(VT-UX617A. AW)
102
PS
PS
107
108
117
902
902
105
E
D
C
B
A
1
2
3
4

2. US-MECHANISM (TOP VIEW) SECTION

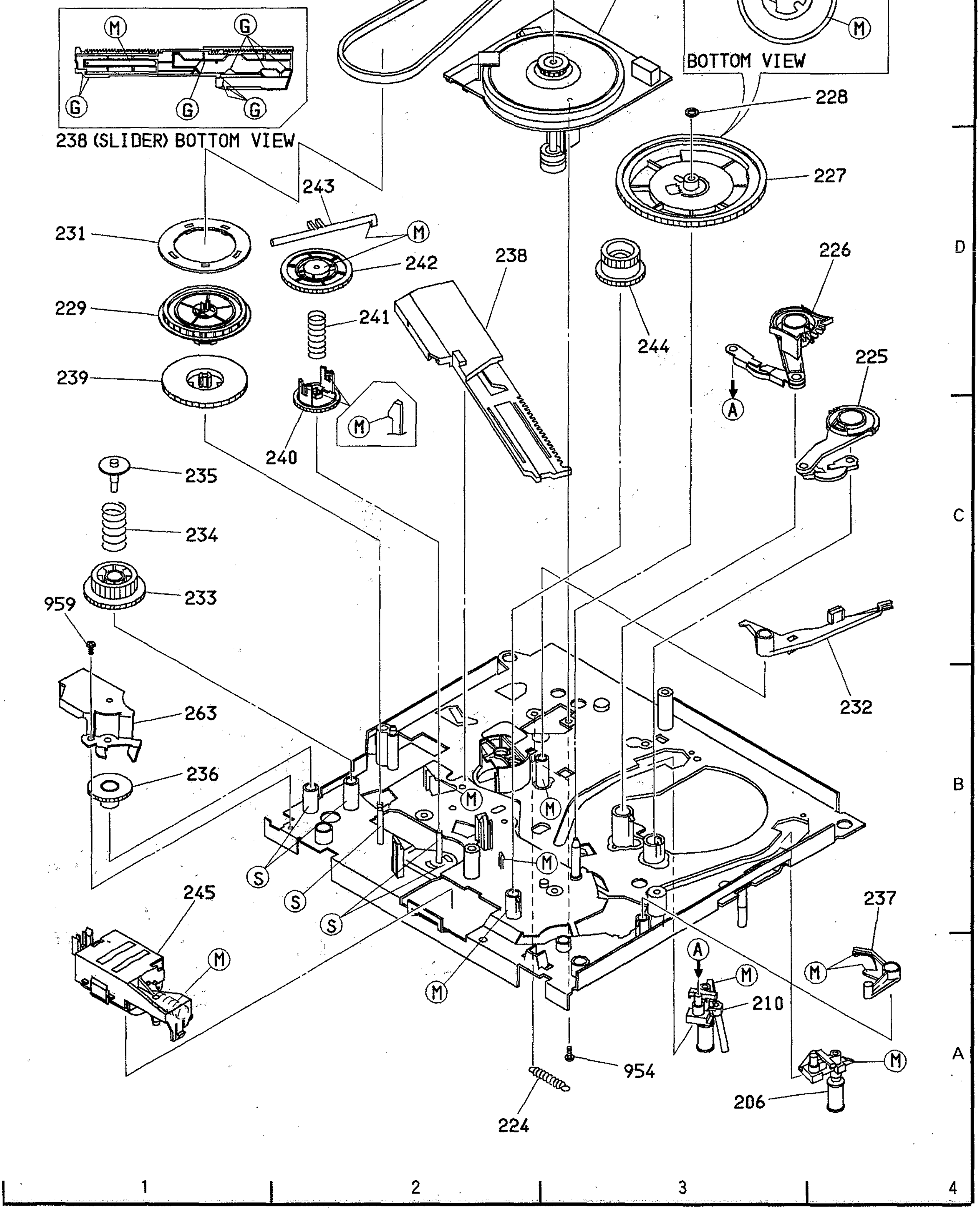
Ⓜ = MOLICOAT (PG-641)
Ⓢ = SONIC SLIDAS OIL (#1600)
Ⓖ = SILICONE (G-332)



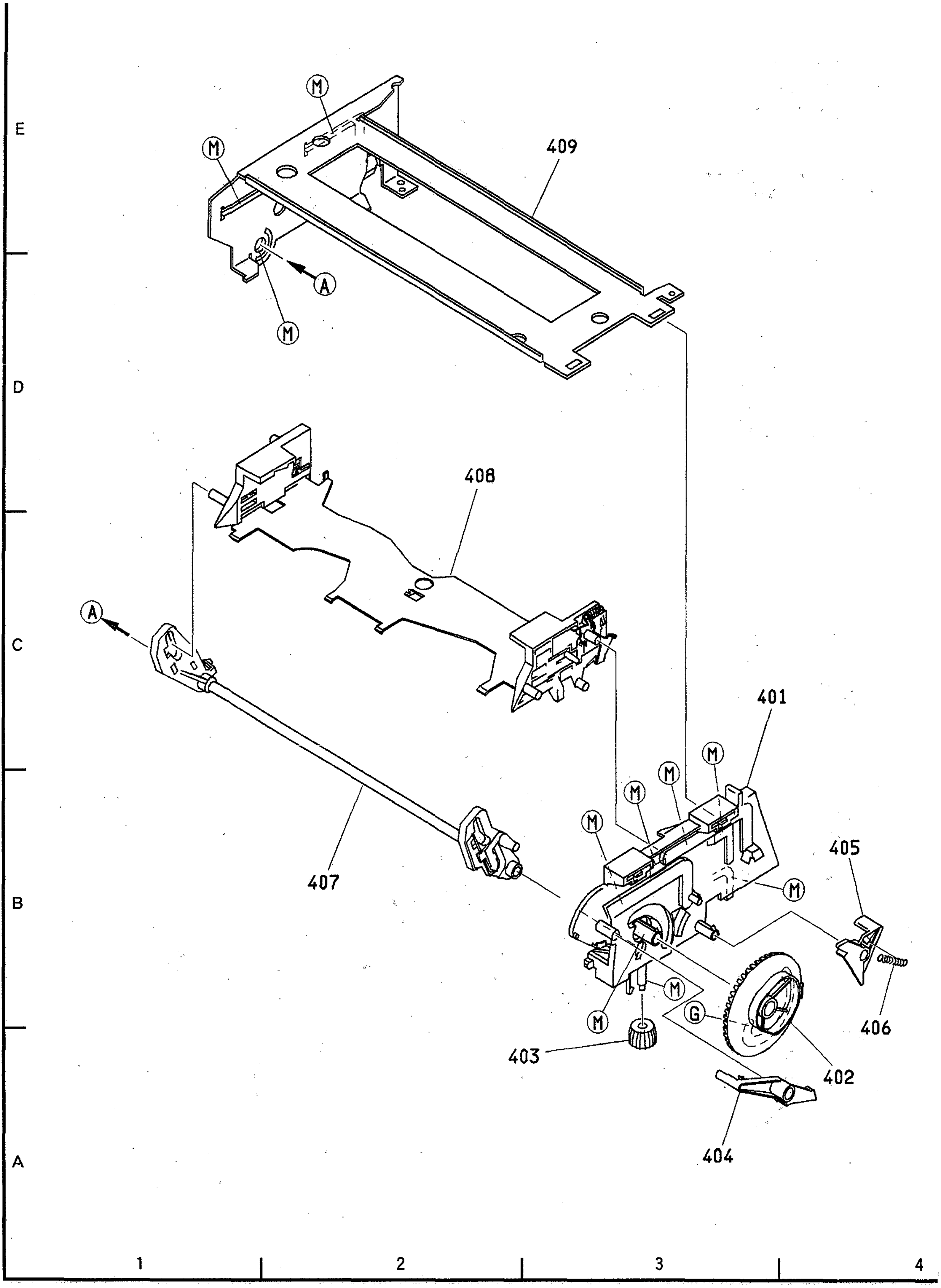
E
D
C
B
A
1
2
3
4
501
203
958
956
223
221
Ⓜ
952
214
220
213
Ⓜ
Ⓜ
951
256
255
BOTTOM VIEW
Ⓜ
219
212
262
261
254
248
216
251
250
215
265
264
264
258
257
Ⓖ
218
957
260
Ⓜ
259
Ⓜ
Ⓢ
Ⓜ
251
Ⓜ
217
251
246
Ⓢ
Ⓢ
Ⓜ
Ⓢ
247
Ⓜ
Ⓢ
249
Ⓜ
Ⓜ
253
252
Ⓜ

3. US-MECHANISM (BOTTOM VIEW) SECTION

Ⓖ = SILICONE (G-332)
Ⓜ = MOLICOAT (PG-641)
Ⓢ = SONIC SLIDAS OIL (#1600)


Ⓜ
Ⓖ
Ⓖ
Ⓖ
Ⓖ
238 (SLIDER) BOTTOM VIEW
230
205
Ⓜ
Ⓜ
Ⓜ
Ⓜ
BOTTOM VIEW
228
227
243
Ⓜ
231
242
238
226
229
241
244
225
239
Ⓐ
240
Ⓜ
235
234
233
959
232
263
236
Ⓜ
Ⓜ
Ⓜ
Ⓢ
Ⓢ
Ⓢ
245
Ⓜ
Ⓜ
237
Ⓜ
Ⓐ
Ⓜ
210
954
Ⓜ
206
224
E
D
C
B
A
1
2
3
4

4. US-FL MECHANISM SECTION


E
D
C
B
A
1
2
3
4
409
408
407
401
405
406
403
402
404
M
A
G

CHAPTER 5 REPLACEMENT PARTS LIST

1. MECHANICAL PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		FOR FINAL ASSEMBLY
101	QA11511	COVER,TOP (HEPM)
102	PH14191	PANEL,FRONT (HEPM) (615A)
102	PH14192	PANEL,FRONT (HEPM) (617A,617AW)
105	PC12551	KNOB,SHUTTLE (HEPM)
106	NT10731	PIECE,FRONT (HEPM)
107	PH14271	DOOR,CASSETTE (HEPM)
108	KL11521	SPRING,DOOR (HEPM)
⚠111	EV10271	CORD,POWER (HEPM)
117	QA11521	COVER,BOTTOM (HEPM)
118	MD11281	COVER,CBA
119	PH14291	PANEL,REAR (HEPM)
139	4826834	SPRING,EARTH
140	MD11602	PLATE,EARTH
203	KX11661	CLEANING,HEAD
205	GP10252	MOTOR,CAPSTAN
206	KX12293	BASE,GUIDE ROLLER (I)
210	KX12302	BASE,GUIDE ROLLER (O)
212	KX11531	ARM,TENSION
213	KL10662	SPRING
214	KX11631	BAND,TENSION
215	KF10641	GEAR,DRIVE
216	KF10701	GEAR,IDLER
217	KX12661	ARM,OUT
218	KX11581	GEAR,SPIRAL
219	KX11553	ARM,PINCH ROLLER
220	KX11451	BASE,CYLINDER
221	KX11941	AC HEAD
223	5423082	FE HEAD
224	KL10711	SPRING
225	KX11591	GEAR,LOADING (L)
226	KX11611	GEAR,LOADING (R)
227	KF10673	GEAR,CAM
228	4344643	WASHER
229	KX11443	PULLEY
230	KX11522	BELT
231	KF10631	FLANGE
232	KX12031	BRAKE
233	KF10571	GEAR,CHANGE
234	KL10771	SPRING
235	KX12001	STOPPER,SPRING
236	KF10561	GEAR,IDLER
237	KX11831	ARM,OPERATION
238	KX11362	SLIDER
239	KF10551	GEAR,TRANS
240	KF10501	GEAR,DRIVE
241	KL10773	SPRING
242	KF10513	GEAR,CHANGE
243	KX11411	ARM,CHANGE
244	KX11371	GEAR
245	KX11892	MOTOR,LOADING
246	KF10521	GEAR,IDLER 1
247	KF10532	GEAR,IDLER 2
248	KH10152	REEL,TABLE (S)
249	KX11423	ARM
250	KH10161	REEL,TABLE (T)
251	KX11991	STOPPER
252	KX11861	BRAKE
253	KL10782	SPRING,BRAKE
254	KX11875	BRAKE,L
255	KX11883	BRAKE,R
256	KL10792	SPRING,BRAKE
257	KF10542	GEAR,JOG
258	KX13132	ARM,JOG
259	KX11841	ARM,REC
260	6542482	SPRING
261	KX11811	BRAKE,SUB
262	KL10903	SPRING,SUB
263	KX12461	BRACKET,BASE
264	MN11571	WASHER
265	KL11062	SPRING,JOG
401	KX11772	BRACKET (R)
402	KF10682	GEAR 1
403	KF10691	GEAR 2
404	KX11751	ARM,DOOR
405	KX11761	ARM,SWITCH
406	6323723	SPRING
407	KX11931	ARM,DRIVE
408	KX11922	HOLDER,CASSETTE
409	KX11741	BRACKET (L)
501	HX10295	CYLINDER ASSY (CY-U6N1)
901	8699410	SCREW (3X10)
902	MK10271	SCREW (3X12DT)
903	8671306	SCREW (2.6X6)
904	7781132	BT SCREW
905	7784323	SCREW (3X8)
951	8652408	SCREW (PSW3X8)
952	0671310	DT SCREW-2.6MMDX10MM
953	0671306	DT SCREW 2.6MMDX6MM
954	8691306	BT SCREW 2.6MM
956	KX12443	SCREW
957	MJ10341	SCREW (M2.6)
958	0671308	DT SCREW-2.6MMDX8MM
959	0671305	DT SCREW-2.6MMDX5MM
		FOR ACCESSORIES
802	EW10251	CORD,RF
803	HL10631	REMOTE HAND SET (VT-RM613A) (HEPM) (615A)
803	HL10337	REMOTE HAND SET (VT-RM617A) (HEPM) (617A)
804	EY10271	PLUG (617AW)

2. ELECTRICAL PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		CAPACITORS
C0201	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0203	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0204	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0205	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0206	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0208	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0209	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0211	0800138	ELECTROLYTIC 47UF 6.3V
C0212	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0213	0254458	ELECTROLYTIC 3.3UF+-20% 50V
C0214	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0215	0800115	ELECTROLYTIC 3.3UF 50V
C0216	0209948	CERAMIC CHIP 330PF+-5% 50V
C0218	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C0219	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0220	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0221	0800112	ELECTROLYTIC 2.2UF 50V
C0222	0893039	CERAMIC CHIP 4700PF+-10% 50V
C0223	0800118	ELECTROLYTIC 4.7UF 35V
C0224	0890015	CERAMIC DISC 33PF+-50% 50V
C0225	0890026	CERAMIC DISC 220PF+-10% 50V
C0226	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0227	0800107	ELECTROLYTIC 0.47UF 50V
C0228	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0230	0893002	CERAMIC CHIP 0.033UF+-10% 16V
C0233	0800122	ELECTROLYTIC 10UF 16V
C0234	0800185	ELECTROLYTIC 47UF 6.3V
C0235	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0236	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0237	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0238	0800178	ELECTROLYTIC 4.7UF 35V
C0239	0800179	ELECTROLYTIC 10UF 16V
C0240	0800179	ELECTROLYTIC 10UF 16V
C0241	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0242	0800178	ELECTROLYTIC 4.7UF 35V
C0243	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0244	0254455	ELECTROLYTIC 0.47UF+-20% 50V
C0245	0800177	ELECTROLYTIC 3.3UF 50V
C0246	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0247	0209936	CERAMIC CHIP 33PF+-5% 50V
C0249	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0251	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0252	0209944	CERAMIC CHIP 150PF+-5% 50V
C0254	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0255	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0256	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0260	0209933	CERAMIC CHIP 18PF+-5% 50V
C0262	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0263	0209931	CERAMIC CHIP 12PF+-5% 50V
C0264	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0265	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0273	0209937	CERAMIC CHIP 39PF+-5% 50V
C0402	0800117	ELECTROLYTIC 4.7UF 25V
C0403	0893002	CERAMIC CHIP 0.033UF+-10% 16V
C0404	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0406	0893037	CERAMIC CHIP 3300PF+-10% 50V
C0407	0800122	ELECTROLYTIC 10UF 16V
C0408	0800122	ELECTROLYTIC 10UF 16V
C0409	0209906	CERAMIC DISC 820PF+-5% 50V
C0410	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0411	0800109	ELECTROLYTIC 1.0UF 50V
C0412	0800101	ELECTROLYTIC 0.1UF 50V
C0413	0800101	ELECTROLYTIC 0.1UF 50V
C0414	0800109	ELECTROLYTIC 1.0UF 50V
C0420	0204337	CAPACITOR FILM 0.027UF+-5% 100V
C0421	0890026	CERAMIC DISC 220PF+-10% 50V
C0422	0800335	ELECTROLYTIC 220UF 16V
C0424	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0427	0893037	CERAMIC CHIP 3300PF+-10% 50V
C0428	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0429	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0434	0800117	ELECTROLYTIC 4.7UF 25V
C0435	0893033	CERAMIC CHIP 1500PF+-10% 50V
C0501	0800297	ELECTROLYTIC 22UF 6.3V
C0502	0800287	CAPASITOR 4.7UF+-20% 35V
C0503	0800287	CAPASITOR 4.7UF+-20% 35V
C0504	0800118	ELECTROLYTIC 4.7UF 35V
C0506	0800308	ELECTROLYTIC 33UF 16V
C0507	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0508	0800112	ELECTROLYTIC 2.2UF 50V
C0509	0800143	ELECTROLYTIC 100UF 6.3V
C0510	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0511	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0512	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0513	0800139	ELECTROLYITC 47UF 10V
C0514	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C0517	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0518	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0519	0800143	ELECTROLYTIC 100UF 6.3V
C0520	0800112	ELECTROLYTIC 2.2UF 50V
C0521	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0522	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0524	0800118	ELECTROLYTIC 4.7UF 35V
C0525	0800118	ELECTROLYTIC 4.7UF 35V
C0526	0800118	ELECTROLYTIC 4.7UF 35V
C0528	0880048	MYLAR 0.022UF+-10% 50V
C0529	0800122	ELECTROLYTIC 10UF 16V
C0530	0800291	ELECTROLYTIC 10UF 16V
C0531	0800291	ELECTROLYTIC 10UF 16V
C0532	0800317	ELECTROLYTIC 47UF 16V
C0533	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0534	0800135	ELECTROLYTIC 33UF 16V
C0535	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0601	0207453	ELECTROLYTIC 2.2UF 50V
C0602	0880018	POLYESTER FILM 0.22UF+-10% 50V
C0605	0880053	POLYESTER FILM 0.047UF+-10% 50V (617)
C0605	0890094	CERAMIC DISC 3300PF+-10% 25V (615)
C0606	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0607	0209938	CERAMIC CHIP 47PF+-5% 50V
C0608	0890022	CERAMIC DISC 100PF+-10% 50V
C0609	0800179	ELECTROLYTIC 10UF 16V
C0610	0800141	ELECTROLYTIC 47UF 16V
C0611	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0612	0800128	ELECTROLYTIC 22UF 16V
C0614	0890035	CERAMIC DISC 1000PF+-10% 50V
C0615	0800317	ELECTROLYTIC 47UF 16V
C0620	0890035	CERAMIC DISC 1000PF+-10% 50V
C0621	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0622	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0623	0890043	CERAMIC DISC 0.01UF+-20% 16V
C0624	0890044	CERAMIC DISC 0.022UF+80-20% 25V
⚠ C0851	AN10201S	FILM CAPACITOR 0.1UF+-20% 250V (A)
⚠ C0851	0268741	FILM CAPACITOR 0.1UF 25V (AW)
⚠ C0859	0235992	CERAMIC DISC 2200PF 250V
⚠ C0860	0235992	CERAMIC DISC 2200PF 250V
C0862	AL10192	ELECTROLYTIC 100UF 200V (A)
C0862	AL10191	ELECTROLYTIC 82UF 400V (AW)

SYMBOL-NO	P-NO	DESCRIPTION
C0865	0204284	ELECTROLYTIC 0.047UF 250V
C0866	0880053	POLYESTER FILM 0.047UF+-10% 50V
C0867	0880039	POLYESTER FILM 0.0047UF+-10% 50V
C0868	0880035	POLYESTER FILM 0.0022UF+-10% 50V
C0870	0254403	CAPACITOR 22UF+-20% 50V
C0871	0254405	CAPACITOR 1000UF+-20% 25V
C0872	0800354	ELECTROLYTIC 470UF 25V
C0873	0254408	ELECTROLYTIC 3300UF 25V
C0874	0800352	ELECTROLYTIC 470UF 10V
C0875	0880044	POLYESTER FILM 0.01UF+-10% 50V
C0876	0800308	ELECTROLYTIC 33UF 16V
C0878	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0882	0800192	ELECTROLYTIC 100UF 16V
C0885	AJ10131R	CERAMIC CAPACITOR 470PF+-10% 500V
C0888	1143005	CERAMIC CAPACITOR 220PF+-5% 1KV (A)
C0888	1143004	CERAMIC CAPACITOR 150PF+-5% 1KV (AW)
C0901	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0902	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0904	0217516	CAPACITOR 0.047UF+80-20% 5.5V
C0907	0209927	CERAMIC CHIP 7.0PF+-0.5% 50V
C0908	0209927	CERAMIC CHIP 7.0PF+-0.5% 50V
C0909	0209932	CERAMIC CHIP 15PF+-5% 50V
C0910	0209932	CERAMIC CHIP 15PF+-5% 50V
C0912	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0913	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0914	0800308	ELECTROLYTIC 33UF 16V
C0915	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0916	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0917	0800141	ELECTROLYTIC 47UF 16V
C0918	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0919	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0920	0209938	CERAMIC CHIP 47PF+-5% 50V
C0922	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0923	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0924	0209938	CERAMIC CHIP 47PF+-5% 50V
C0925	0209938	CERAMIC CHIP 47PF+-5% 50V
C0926	0209935	CERAMIC CHIP 27PF+-5% 50V
C0927	0209948	CERAMIC CHIP 330PF+-5% 50V
C0928	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0940	0209943	CERAMIC DISC 120PF+-5%
C0942	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0972	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0980	0890043	CERAMIC DISC 0.01UF+-20% 16V
C0981	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0982	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0983	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C0984	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C0985	0209904	CERAMIC DISC 560PF+-5% 50V
C1102	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1103	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1104	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1105	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1106	0800185	ELECTROLYTIC 47UF 6.3V
C1107	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1108	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1110	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1111	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1112	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1114	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1115	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1116	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1117	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1118	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1119	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1120	0893091	CERAMIC CHIP 0.022UF+-10% 16V

SYMBOL-NO	P-NO	DESCRIPTION
C1121	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1122	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1123	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1124	0893031	CERAMIC CHIP 1000PF+-10% 50V
C1125	0800185	ELECTROLYTIC 47UF 6.3V
C1126	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1127	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C1128	0800185	ELECTROLYTIC 47UF 6.3V
C1129	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1131	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1134	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1135	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1136	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1137	0209935	CERAMIC CHIP 27PF+-5% 50V
C1138	0209943	CERAMIC DISC 120PF+-5%
C1140	0209943	CERAMIC DISC 120PF+-5%
C1141	0893031	CERAMIC CHIP 1000PF+-10% 50V
C1401	0890043	CERAMIC DISC 0.01UF+-20% 16V
C1402	0209943	CERAMIC DISC 120PF+-5%
C1403	0800118	ELECTROLYTIC 4.7UF 35V
C1404	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1405	0890043	CERAMIC DISC 0.01UF+-20% 16V
C1409	0209937	CERAMIC CHIP 39PF+-5% 50V
C1410	0209936	CERAMIC CHIP 33PF+-5% 50V
C1411	0209945	CERAMIC DISC 180PF+-5% 50V
C1414	0800122	ELECTROLYTIC 10UF 16V
C1415	0800118	ELECTROLYTIC 4.7UF 35V
C1416	0800317	ELECTROLYTIC 47UF 16V
C1417	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1419	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1424	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1425	0209931	CERAMIC CHIP 12PF+-5% 50V
C1426	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C1427	0890039	CERAMIC DISC 4700PF+-20% 16V
C1428	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1701	0800185	ELECTROLYTIC 47UF 6.3V
C1702	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C1703	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C1704	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C1705	0890035	CERAMIC DISC 1000PF+-10% 50V
C1706	0800185	ELECTROLYTIC 47UF 6.3V
C1707	0800176	ELECTROLYTIC 2.2UF 50V
C1708	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1802	0800291	ELECTROLYTIC 10UF 16V
C1811	0800317	ELECTROLYTIC 47UF 16V
C2102	0890044	CERAMIC DISC 0.022UF 50V
C2501	0890038	CERAMIC DISC 3300PF+-20% 16V
C2502	0893037	CERAMIC CHIP 3300PF+-10% 50V
C2503	0800073	ELECTROLYTIC 470UF 10V
C2504	0890043	CERAMIC DISC 0.01UF+-20% 16V
C2505	0800291	ELECTROLYTIC 10UF 16V
C2506	0800291	ELECTROLYTIC 10UF 16V
C2507	0800287	CAPASITOR 4.7UF+-20% 35V
C2508	0890038	CERAMIC DISC 3300PF+-20% 16V
C2509	0800287	CAPASITOR 4.7UF+-20% 35V
C2513	0800317	ELECTROLYTIC 47UF 16V
C2514	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2517	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2518	0800044	ELECTROLYTIC 47UF 50V
C2519	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2520	0800335	ELECTROLYTIC 220UF 16V
C2524	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2525	0800291	ELECTROLYTIC 10UF 16V
C2531	0800287	CAPASITOR 4.7UF+-20% 35V
C2532	0890044	CERAMIC DISC 0.022UF+80-20% 25V

SYMBOL-NO	P-NO	DESCRIPTION	
C2539	0890029	CERAMIC DISC 390PF+-10% 50V	
C2901	0893031	CERAMIC CHIP 1000PF+-10% 50V	(615)
C2902	0800109	ELECTROLYTIC 1.0UF 50V	(615)
C2903	0893044	CERAMIC CHIP 0.01UF+-10% 50V	(615)
C2904	0800122	ELECTROLYTIC 10UF 16V	(615)
C2905	0893044	CERAMIC CHIP 0.01UF+-10% 50V	(615)
C2906	0800122	ELECTROLYTIC 10UF 16V	(615)
C2907	0800112	ELECTROLYTIC 2.2UF 50V	(615)
C2908	0890035	CERAMIC DISC 1000PF+-10% 50V	(615)
C2909	0209944	CERAMIC CHIP 150PF+-5% 50V	(615)
C2910	0209944	CERAMIC CHIP 150PF+-5% 50V	(615)
C4401	0800365	ELECTROLYTIC 2200UF 6V	(617)
C4402	0893086	CERAMIC CHIP 0.1UF+80-20% 50V	(617)
C4403	0800029	ELECTROLYTIC 33UF 6.3V	(617)
C4404	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4405	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4406	0890043	CERAMIC DISC 0.01UF+-20% 16V	(617)
C4407	0800015	ELECTROLYTIC 10UF 16V	(617)
C4408	0800001	ELECTROLYTIC 0.47UF 50V	(617)
C4409	0202163	CERAMIC CAPACITOR 560PF+-5% 50V	(617)
C4410	0209945	CERAMIC DISC 180PF+-5% 50V	(617)
C4411	0893062	CERAMIC CHIP 1UF+80-20% 16V	(617)
C4412	0893031	CERAMIC CHIP 1000PF+-10% 50V	(617)
C4413	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4414	0893008	CERAMIC CHIP 0.1UF +-10% 16V	(617)
C4415	0800038	ELECTROLYTIC 47UF 6.3V	(617)
C4416	0893062	CERAMIC CHIP 1UF+80-20% 16V	(617)
C4417	0202163	CERAMIC CAPACITOR 560PF+-5% 50V	(617)
C4418	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4419	0202163	CERAMIC CAPACITOR 560PF+-5% 50V	(617)
C4420	0800007	ELECTROLYTIC 3.3UF 50V	(617)
C4421	0893037	CERAMIC CHIP 3300PF+-10% 50V	(617)
C4422	0800038	ELECTROLYTIC 47UF 6.3V	(617)
C4423	0207456	ELECTROLYTIC 1UF 50V	(617)
C4424	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4425	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4426	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4436	0800015	ELECTROLYTIC 10UF 16V	(617)
C4437	0800041	ELECTROLYTIC 47UF 16V	(617)
C4438	0890043	CERAMIC DISC 0.01UF+-20% 16V	(617)
C4439	0800015	ELECTROLYTIC 10UF 16V	(617)
C4440	0800015	ELECTROLYTIC 10UF 16V	(617)
C4441	0890043	CERAMIC DISC 0.01UF+-20% 16V	(617)
C4501	0800038	ELECTROLYTIC 47UF 6.3V	(617)
C4502	0893082	CERAMIC CHIP 0.022UF	(617)
C4503	0800003	ELECTROLYTIC 1UF 50V	(617)
C4504	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4505	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4506	0800029	ELECTROLYTIC 33UF 6.3V	(617)
C4507	0800038	ELECTROLYTIC 47UF 6.3V	(617)
C4508	0890043	CERAMIC DISC 0.01UF+-20% 16V	(617)
C4509	0209950	CERAMIC CHIP 470PF+-5% 50V	(617)
C4510	0893091	CERAMIC CHIP 0.022UF+-10% 16V	(617)
C4511	0893013	CERAMIC CHIP 0.22UF+-10% 16V	(617)
C4512	0893079	CERAMIC DISC 0.01UF+80-20% 50V	(617)
C4513	0893055	CERAMIC CHIP 0.1UF+80-20% 16V	(617)
C4514	0209936	CERAMIC CHIP 33PF+-5% 50V	(617)
C4515	0209936	CERAMIC CHIP 33PF+-5% 50V	(617)
C4516	0800041	ELECTROLYTIC 47UF 16V	(617)
C4601	AJ10188R	CERAMIC DISC 33PF+-5% 50V	(617)
C4602	AJ10187R	CERAMIC DISC 27PF+-5% 50V	(617)
C4603	0800003	ELECTROLYTIC 1UF 50V	(617)
C4604	0890022	CERAMIC DISC 100PF+-10% 50V	(617)
C4605	0890043	CERAMIC DISC 0.01UF+80-20% 25V	(617)
C4606	0800015	ELECTROLYTIC 10UF 16V	(617)

SYMBOL-NO	P-NO	DESCRIPTION	
C4608	AJ10197R	CERAMIC DISC 150P+-50% 50V	(617)
C4609	0890043	CERAMIC DISC 0.01UF+-20% 16V	(617)
C4610	0800015	ELECTROLYTIC 10UF 16V	(617)
C4611	0890043	CERAMIC DISC 0.01UF+-20% 16V	(617)
C4615	0800003	ELECTROLYTIC 1UF 50V	(617)
C4617	0800012	ELECTROLYTIC 4.7UF 50V	(617)
C4618	0890045	CERAMIC DISC 0.047UF+-20% 50V	(617)
		RESISTORS	
R0205	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W	
R0206	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0207	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0208	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0212	0700058	CARBON FILM 22KOHM+-5% 1/8W	
R0213	0700058	CARBON FILM 22KOHM+-5% 1/8W	
R0215	0700039	CARBON FILM 820 OHM+-5% 1/8W	
R0216	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R0217	0700059	CARBON FILM 27KOHM+-5% 1/8W	
R0218	0700027	CARBON FILM 100 OHM+-5% 1/8W	
R0227	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0228	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0229	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	
R0238	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	
R0240	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W	
R0241	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	
R0253	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W	
R0254	0700075	CARBON FILM 390KOHM+-5% 1/8W	
R0257	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W	
R0258	0700027	CARBON FILM 100 OHM+-5% 1/8W	
R0263	0101391	CARBON FILM 2.2MOHM+-5% 1/8W	
R0265	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	
R0402	0700059	CARBON FILM 27KOHM+-5% 1/8W	
R0403	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	
R0404	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W	
R0407	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W	
R0408	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	
R0409	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W	
R0410	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0420	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0421	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0422	0103819	CHIP RESISTOR 10 OHM+-5% 0.1W	
R0423	0700057	CARBON FILM 18KOHM+-5% 1/8W	
R0424	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	
R0425	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	
R0426	0700063	CARBON FILM 47KOHM+-5% 1/8W	
R0427	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R0429	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0430	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0431	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0432	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0434	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	
R0435	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	
R0436	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	
R0437	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	
R0501	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R0502	0700048	CARBON FILM 3.9KOHM+-5% 1/8W	
R0503	0700063	CARBON FILM 47KOHM+-5% 1/8W	
R0504	0700058	CARBON FILM 22KOHM+-5% 1/8W	
R0505	0700063	CARBON FILM 47KOHM+-5% 1/8W	
R0506	0700058	CARBON FILM 22KOHM+-5% 1/8W	
R0509	0700049	CARBON FILM 4.7KOHM+-5% 1/8W	
R0510	0104252	CHIP RESISTOR 510 OHM+-5% 1/10W	
R0511	0104308	CHIP RESISTOR 15KOHM+-0.1% 1/16W	
R0512	0104307	CHIP RESISTOR 11KOHM+-0.1% 1/16W	

SYMBOL-NO	P-NO	DESCRIPTION	
R0516	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0517	0104252	CHIP RESISTOR 510 OHM+-5% 1/10W	
R0520	0700063	CARBON FILM 47KOHM+-5% 1/8W	
R0521	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0522	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	
R0523	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0524	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R0525	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W	
R0526	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R0527	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R0530	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W	
R0531	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	
R0532	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0533	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W	
R0534	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0540	0700033	CARBON FILM 270 OHM+-5% 1/8W	
R0541	0700033	CARBON FILM 270 OHM+-5% 1/8W	
R0602	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0605	0700049	CARBON FILM 4.7KOHM+-5% 1/8W	
R0615	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0621	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0622	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0623	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0624	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0625	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0626	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0627	0700036	CARBON FILM 470 OHM+-5% 1/8W	
R0628	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R0629	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W	
R0630	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W	
R0631	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W	
R0632	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0633	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	
R0634	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0635	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0636	0700047	CARBON FILM 3.3KOHM+-5% 1/8W	
R0637	0700044	CARBON FILM 1.8KOHM+-5% 1/8W	
R0638	0700044	CARBON FILM 1.8KOHM+-5% 1/8W	
R0639	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(617)
R0710	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0711	0700063	CARBON FILM 47KOHM+-5% 1/8W	
R0712	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R0713	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	
R0714	0103827	CHIP RESISTOR 47 OHM+-5% 0.1W	
⚠R0851	AT10401G	RESISTOR 4.7MOHM+-10% 1/2W	
⚠R0852	AT10211M	CHIP RESISTOR 1MOHM 1/2W	
R0853	0700074	CARBON FILM 330KOHM+-5% 1/8W	
R0854	0700074	CARBON FILM 330KOHM+-5% 1/8W	
R0855	0700074	CARBON FILM 330KOHM+-5% 1/8W	
R0856	AT10246S	RESISTOR 0.33 OHM+-5% 1W	
R0857	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0858	0700032	CARBON FILM 220 OHM+-5% 1/8W	
R0860	0116664	CHIP RESISTOR 68KOHM+-5% 2W	(A)
R0860	0116671	CHIP RESISTOR 100KOHM+-5% 3W	(AW)
R0861	0116664	CHIP RESISTOR 68KOHM+-5% 2W	(A)
R0861	0116671	CHIP RESISTOR 100KOHM+-5% 3W	(AW)
R0862	0700047	CARBON FILM 3.3KOHM+-5% 1/8W	
R0863	0700055	CARBON FILM 12KOHM+-5% 1/8W	
R0864	0700033	CARBON FILM 270 OHM+-5% 1/8W	
R0865	0700038	CARBON FILM 680 OHM+-5% 1/8W	
R0866	0700034	CARBON FILM 330 OHM+-5% 1/8W	
R0867	0700038	CARBON FILM 680 OHM+-5% 1/8W	
R0868	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0869	0104114	CHIP RESISTOR 3.3KOHM+-1% 0.1W	
R0871	0105572	METAL FILM RESISTOR 2.7KOHM+-1% 1/10	
R0872	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R0873	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R0874	0700058	CARBON FILM 22KOHM+-5% 1/8W	
R0875	0700032	CARBON FILM 220 OHM+-5% 1/8W	
R0878	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	(A)
R0879	0700038	CARBON FILM 680 OHM+-5% 1/8W	(A)
R0880	0700032	CARBON FILM 220 OHM+-5% 1/8W	(A)
R0880	0700036	CARBON FILM 470 OHM+-5% 1/8W	(AW)
R0885	0700056	CARBON FILM 15KOHM+-5% 1/8W	
R0886	0700056	CARBON FILM 15KOHM+-5% 1/8W	
R0887	0700046	CARBON FILM 2.7KOHM+-5% 1/8W	
R0889	0700062	CARBON FILM 39KOHM+-5% 1/8W	
R0891	0700058	CARBON FILM 22KOHM+-5% 1/8W	
R0892	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0893	0700058	CARBON FILM 22KOHM+-5% 1/8W	(A)
R0894	0700058	CARBON FILM 22KOHM+-5% 1/8W	(A)
R0901	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0902	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0903	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0904	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R0905	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0906	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0907	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0908	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0909	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	
R0910A	0700056	CARBON FILM 15KOHM+-5% 1/8W	(615)
R0911	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	
R0913	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0914	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0915	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0916	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0917	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0918	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0919	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0920	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R0921	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0922	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0923	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0924	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	
R0925	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	
R0926	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	
R0927	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0928	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0929	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0934	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0935	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	
R0936	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0937	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	
R0938	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R0939	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0940	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R0941	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0943	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0944	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0945	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0946	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0947	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0948	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0950	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0951	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0952	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0954	0700073	CARBON FILM 270KOHM+-5% 1/8W	
R0955	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R0956	0700036	CARBON FILM 470 OHM+-5% 1/8W	
R0957	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	

SYMBOL-NO	P-NO	DESCRIPTION	
R0963	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0967	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R0969	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	
R0970	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	
R0971	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R0972	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
⚠R0976	0101725	CHIP RESISTOR 2.2 OHM+-5% 1/4W	
R0977	0700067	CARBON FILM 100KOHM+-5% 1/8W	
R0978	0101765	RESISTOR 10KOHM+-1% 1/8W	
R0979	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	
R0980	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R0981	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0983	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0984	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R0988	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W	
R0990	0700067	CARBON FILM 100KOHM+-5% 1/8W	
R0991	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W	
R0992	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W	
R0993	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0994	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R0995	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W	
R0996	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	
R0997	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	
R0998	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W	
R0999	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1101	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W	
R1103	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R1104	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R1107	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R1108	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R1109	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	
R1110	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W	
R1112	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R1113	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R1115	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W	
R1116	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	
R1117	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1118	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	
R1120	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	
R1121	0700032	CARBON FILM 220 OHM+-5% 1/8W	
R1403	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R1405	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R1406	0700024	CARBON FILM 56 OHM+-5% 1/8W	
R1407	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W	
R1409	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R1410	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W	
R1412	0700076	CARBON FILM 470KOHM+-5% 1/8W	
R1413	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R1416	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R1418	0700027	CARBON FILM 100 OHM+-5% 1/8W	
R1421	0700027	CARBON FILM 100 OHM+-5% 1/8W	
R1422	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R1423	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	
R1424	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	
R1430	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R1432	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R1433	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	
R1434	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	
R1437	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	
R1438	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R1701	0700036	CARBON FILM 470 OHM+-5% 1/8W	
R1702	0700036	CARBON FILM 470 OHM+-5% 1/8W	
R1703	0700038	CARBON FILM 680 OHM+-5% 1/8W	
R1704	0700049	CARBON FILM 4.7KOHM+-5% 1/8W	
R1705	0700067	CARBON FILM 100KOHM+-5% 1/8W	
R1715	0700062	CARBON FILM 39KOHM+-5% 1/8W	
R1716	0700047	CARBON FILM 3.3KOHM+-5% 1/8W	
R1717	0700057	CARBON FILM 18KOHM+-5% 1/8W	
R1718	0700038	CARBON FILM 680 OHM+-5% 1/8W	
R1719	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1720	0700051	CARBON FILM 5.6KOHM+-5% 1/8W	
R1721	0700039	CARBON FILM 820 OHM+-5% 1/8W	
R1722	0700048	CARBON FILM 3.9KOHM+-5% 1/8W	
R1723	0700037	CARBON FILM 560 OHM+-5% 1/8W	
R1724	0700047	CARBON FILM 3.3KOHM+-5% 1/8W	
R1725	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R1726	0700035	CARBON FILM 390 OHM+-5% 1/8W	
R1727	0700044	CARBON FILM 1.8KOHM+-5% 1/8W	
R1728	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1729	0700049	CARBON FILM 4.7KOHM+-5% 1/8W	
R1730	0700049	CARBON FILM 4.7KOHM+-5% 1/8W	
R1731	0700049	CARBON FILM 4.7KOHM+-5% 1/8W	
R1732	0700063	CARBON FILM 47KOHM+-5% 1/8W	
R1733	0700029	CARBON FILM 150 OHM+-5% 1/8W	
R1735	0700033	CARBON FILM 2700HM+-5% 1/8W	(617)
R1802	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	
R1806	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1807	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1808	0700053	CARBON FILM 8.2KOHM+-5% 1/8W	
R1809	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1818	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1820	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R1822	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R2101	0700059	CARBON FILM 27KOHM+-5% 1/8W	
R2102	0700067	CARBON FILM 100KOHM+-5% 1/8W	
R2103	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	
R2104	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	
R2105	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	
R2106	0103893	CHIP RESISTOR 75 OHM+-5% 1/8W	
R2107	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R2108	0700048	CARBON FILM 3.9KOHM+-5% 1/8W	
R2109	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R2110	0700048	CARBON FILM 3.9KOHM+-5% 1/8W	
R2111	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R2112	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	
R2113	0103893	CHIP RESISTOR 75 OHM+-5% 1/8W	
R2114	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	
R2115	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R2116	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R2117	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	
R2501	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R2502	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	
R2503	0101400	CARBON FILM 75 OHM+-5% 1/8W	
R2504	0700023	CARBON FILM 47 OHM+-5% 1/8W	
R2507	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	
R2508	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	
R2509	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	
R2510	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	
R2511	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	
R2512	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W	
R2514	0101835	CARBON FILM 1.5KOHM+-5% 1/4W	
R2515	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W	
R2517	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W	
R2518	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(615)
R2523	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	
R2524	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	
R2527	0700063	CARBON FILM 47KOHM+-5% 1/8W	
R2530	0700023	CARBON FILM 47 OHM+-5% 1/8W	
R2533	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R2534	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	

SYMBOL-NO	P-NO	DESCRIPTION	
R2535	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W	
R2536	0700019	CARBON FILM 27 OHM+-5% 1/8W	
R2538	0700025	CARBON FILM 68OHM+-5% 1/8W	
R2539	0103834	CHIP RESISTOR 180OHM+-5% 0.1W	
R2540	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	
R2541	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W	
R2542	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R2701	0700057	CARBON FILM 18KOHM+-5% 1/8W	
R2702	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R2703	0700057	CARBON FILM 18KOHM+-5% 1/8W	
R2704	0700054	CARBON FILM 10KOHM+-5% 1/8W	
R2706	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R2707	0700039	CARBON FILM 820 OHM+-5% 1/8W	
R2708	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R2709	0700027	CARBON FILM 100 OHM+-5% 1/8W	
R2710	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R2711	0700032	CARBON FILM 220 OHM+-5% 1/8W	
R2712	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	
R2713	0700029	CARBON FILM 150 OHM+-5% 1/8W	
R2714	0700043	CARBON FILM 1.5KOHM+-5% 1/8W	
R2901	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(615)
R2902	0700032	CARBON FILM 220 OHM+-5% 1/8W	(615)
R2903	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W	(615)
R2904	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(615)
R2905	0700081	CARBON FILM 1.0MOHM+-5% 1/8W	(615)
R2906	0700047	CARBON FILM 3.3KOHM+-5% 1/8W	(615)
R2907	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	(615)
R2908	0700027	CARBON FILM 100 OHM+-5% 1/8W	(615)
R2909	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(615)
R4401	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	(617)
R4402	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(617)
R4403	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	(617)
R4404	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	(617)
R4405	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4406	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4407	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	(617)
R4408	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	(617)
R4409	0700063	CARBON FILM 47KOHM+-5% 1/8W	(617)
R4411	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	(617)
R4412	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	(617)
R4413	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	(617)
R4414	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	(617)
R4415	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	(617)
R4416	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	(617)
R4417	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	(617)
R4418	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(617)
R4419	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	(617)
R4420	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	(617)
R4421	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	(617)
R4422	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	(617)
R4423	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	(617)
R4424	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	(617)
R4425	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4426	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	(617)
R4427	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W	(617)
R4428	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4429	0104113	CHIP RESISTOR 2.2KOHM+-1% 0.1W	(617)
R4430	0104113	CHIP RESISTOR 2.2KOHM+-1% 0.1W	(617)
R4431	0105147	CHIP RESISTOR 100KOHM+-1% 1/10W	(617)
R4432	0104117	CHIP RESISTOR 82KOHM 1/10W	(617)
R4433	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	(617)
R4434	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W	(617)
R4435	0103869	CHIP RESISTOR 150KOHM+-5% 0.1W	(617)
R4436	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	(617)
R4437	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	(617)
R4438	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	(617)
R4439	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	(617)
R4449	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(617)
R4450	0700027	CARBON FILM 100 OHM+-5% 1/8W	(617)
R4451	0700054	CARBON FILM 10KOHM+-5% 1/8W	(617)
R4452	0104271	CHIP RESISTOR 15KOHM+-1% 1/10W	(617)
R4453	0104119	CHIP RESISTOR 18KOHM+-1% 1/10W	(617)
R4454	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	(617)
R4457	0104271	CHIP RESISTOR 15KOHM+-1% 1/10W	(617)
R4458	0104116	CHIP RESISTOR 39KOHM 1/10W	(617)
R4459	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	(617)
R4460	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	(617)
R4461	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W	(617)
R4462	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W	(617)
R4464	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W	(617)
R4465	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	(617)
R4501	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4504	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4506	0104117	CHIP RESISTOR 82KOHM 1/10	(617)
R4507	0104119	CHIP RESISTOR 18KOHM+-1% 1/10W	(617)
R4508	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	(617)
R4509	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W	(617)
R4510	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(617)
R4511	0104122	CHIP RESISTOR 33KOHM+-1% 0.1W	(617)
R4512	0105122	CHIP RESISTOR 56KOHM+-1% 1/10W	(617)
R4513	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4514	0104117	CHIP RESISTOR 82KOHM 1/10W	(617)
R4515	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	(617)
R4516	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4517	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4518	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4520	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	(617)
R4521	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	(617)
R4522	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	(617)
R4523	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W	(617)
R4524	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	(617)
R4525	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	(617)
R4526	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4527	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4529	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4601	0700058	CARBON FILM 22KOHM+-5% 1/8W	(617)
R4602	0700054	CARBON FILM 10KOHM+-5% 1/8W	(617)
R4603	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4604	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4605	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4606	0700041	CARBON FILM 1.0KOHM+-5% 1/8W	(617)
R4607	0700027	CARBON FILM 100 OHM+-5% 1/8W	(617)
R4608	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	(617)
R4609	0700081	CARBON FILM 1.0MOHM+-5% 1/8W	(617)
R4611	0700054	CARBON FILM 10KOHM+-5% 1/8W	(617)
R4612	0700054	CARBON FILM 10KOHM+-5% 1/8W	(617)
R4613	0700054	CARBON FILM 10KOHM+-5% 1/8W	(617)
R4614	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	(617)
R4615	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	(617)
R4626	0700072	CARBON FILM 220KOHM+-5% 1/8W	(617)
R4627	0700072	CARBON FILM 220KOHM+-5% 1/8W	(617)
R4628	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	(617)
R4629	0700045	CARBON FILM 2.2KOHM+-5% 1/8W	(617)
R4632	0700058	CARBON FILM 22KOHM+-5% 1/8W	(617)
R4671	0700027	CARBON FILM 100 OHM+-5% 1/8W	(617)
R4694	0700041	CARBON FILM 1KOHM+-5% 1/8W	(617)
R4695	0700041	CARBON FILM 1KOHM+-5% 1/8W	(617)
R4697	0700041	CARBON FILM 1KOHM+-5% 1/8W	(617)
R4698	0700058	CARBON FILM 22KOHM+-5% 1/8W	(617)
RT1801	AW10188R	SEMI VARIABLE 22KOHM	

SYMBOL-NO	P-NO	DESCRIPTION	
		SEMI-CONDUCTORS	
D0603	5339231	DIODE 1SR35-100A	
D0604	5339231	DIODE 1SR35-100A	
⚠D0851	5336552	DIODE S1WBA60	
D0852	CH10191M	DIODE EG01C-T	
D0853	CH10481M	DIODE AG01Z	
D0856	CH10481M	DIODE AG01Z	
D0857	CH10462S	DIODE S3L20U	
D0858	1331361	DIODE RK34	
D0860	5339551	DIODE SS1J4	
D0861	5339551	DIODE SS1J4	
D0864	CH10191M	DIODE EG01C-T	
D0901	5339551	DIODE SS1J4	
D0906	5339071	DIODE 1SS119	
D0907	5339071	DIODE 1SS119	
D0908	5339231	DIODE 1SR35-100A	
D0909	5339231	DIODE 1SR35-100A	
D1101	5339071	DIODE 1SS119	
D1102	5328307	DIODE MA151WK	
D1403	5339071	DIODE 1SS119	
D1701	5339071	DIODE 1SS119	
D2501	5339071	DIODE 1SS119	
D2502	5339071	DIODE 1SS119	
D2504	5339071	DIODE 1SS119	
D4401	5339551	DIODE SS1J4	(617)
D4402	5339071	DIODE 1SS119	(617)
D4404	5328308	DIODE MA152WK	(617)
D4502	5339071	DIODE 1SS119	(617)
D4601	5339131	DIODE 1SS254	(617)
D4602	5339131	DIODE 1SS254	(617)
D4603	5339131	DIODE 1SS254	(617)
D4604	5339131	DIODE 1SS254	(617)
D4605	5339131	DIODE 1SS254	(617)
D4606	5339131	DIODE 1SS254	(617)
IC0201	CK14411	IC HA118203F	(617)
IC0201	CK14412	IC HA118203NF	(615)
IC0202	CK13571R	IC MSM7470-72MS-KR1	
IC0501	CK14421	IC AN3964FB	
IC0851	1360452	IC TL431CLP	
IC0901	CK15001	IC HD6433977SB01F	
IC0902	CP10312R	IC PST9129	
IC0903	CP10915	IC ST24C02FB6	
IC0904	CP10291	IC BA6209	
IC0905	CP11361R	IC M5278L05	
IC1101	CK14481	IC HA118198FP	
IC1102	CP11191	IC LA7256	
IC1701	CZ10181	IC BU9716K	
IC1801	CS10352	MODULE HTS7337A	
IC2101	CJ10211	PHOTO INTERLAPTER SG-236	
IC2102	CJ10221	PHOTO INTERLAPTER SG-237	
IC2501	CK13501R	IC NJM2533M	(615)
IC2501	CK13502R	IC NJM2534M	(617)
IC2901	CP11001	IC LC7455A	(615)
IC4401	CP11436	IC M37267M8-210SP	(617)
IC4402	CK11171	IC X24C16S8	(617)
IC4403	1340112	IC PST520C	(617)
IC4405	CK11252	IC MM1108XFFE	(617)
IC4406	1352032	IC NJM2249M	(617)
IC4407	CK13503R	IC NJM2535M	(617)
IC4408	5361312	IC UPD4066BG	(617)
IC4502	1340112	IC PST520C	(617)
IC4503	CK15392R	IC NJM2082M (HEPM)	(617)
IC4504	5361312	IC UPD4066BG	(617)

SYMBOL-NO	P-NO	DESCRIPTION	
IC4601	CK15392R	IC NJM2082M (HEPM)	(617)
IC4602	5361312	IC UPD4066C	(617)
IC4603	CK14881	IC AT24C02	(617)
LD1701	CH10781R	DIODE SLP3117E	
LD1702	CH10781R	DIODE SLP3117E	
LD1703	CH10781R	DIODE SLP3117E	
LD1704	CH10781R	DIODE SLP3117E	
LD1705	CH10781R	DIODE SLP3117E	
LD1706	5381211	LED SEL-2213C	
LD1708	5381214	LED SEL2413E	(617)
LD1709	CH10181G	LED	
LD2101	CH10542	DIODE GL451L1	
Q0226	CA10672R	TRANSISTOR 2SD601A	
Q0228	5326903	TRANSISTOR UN2213	
Q0406	5323172	TRANSISTOR 2SC1214CD	
Q0409	5327001	TRANSISTOR 2SC458CD	
Q0410	5326903	TRANSISTOR UN2213	
Q0411	5327021	TRANSISTOR 2SA844CD	
Q0412	CA10672R	TRANSISTOR 2SD601A	
Q0413	CA10672R	TRANSISTOR 2SD601A	
Q0601	5326903	TRANSISTOR UN2213	(617)
Q0701	1323082	TRANSISTOR 2SA1036K	
Q0702	CA10672R	TRANSISTOR 2SD601A	
Q0851	CF10622	TRANSISTOR FS3KM-10-300	(A)
Q0851	CF10621	TRANSISNTOR FS3KM-18A-300	(AW)
Q0852	CF10451R	TRANSISTOR 2SC3246	
Q0853	1321341	TRANSISTOR 2SD1765	
Q0854	5327262	TRANSISTOR 2SB1326	
Q0855	CA10672R	TRANSISTOR 2SD601A	
Q0858	5327131	TRANSISTOR 2SB562C	(A)
Q0859	5327063	TRANSISTOR 2SC1740S	(A)
Q0864	1321341	TRANSISTOR 2SD1765	
Q0901	5327151	TRANSISTOR 2SA952-ML2	
Q0902	5326903	TRANSISTOR UN2213	
Q0905	CA10582R	TRANSISTOR 2SB709A	
Q0906	CA10582R	TRANSISTOR 2SB709A	
Q0911	CA10582R	TRANSISTOR 2SB709A	
Q0912	5326903	TRANSISTOR UN2213	
Q0913	CA10672R	TRANSISTOR 2SD601A	
Q0914	5326903	TRANSISTOR UN2213	
Q1101	CA10672R	TRANSISTOR 2SD601A	
Q1102	CA10582R	TRANSISTOR 2SB709A	
Q1401	CA10672R	TRANSISTOR 2SD601A	
Q1404	CA10582R	TRANSISTOR 2SB709A	
Q1407	CA10582R	TRANSISTOR 2SB709A	
Q1409	CA10672R	TRANSISTOR 2SD601A	
Q1410	CA10582R	TRANSISTOR 2SB709A	
Q1411	CA10672R	TRANSISTOR 2SD601A	
Q1702	5327063	TRANSISTOR 2SC1740S	
Q1703	5327071	TRANSISTOR DTC124ES	
Q1704	5327071	TRANSISTOR DTC124ES	
Q1706	5327071	TRANSISTOR DTC124ES	
Q1802	5326903	TRANSISTOR UN2213	
Q2101	CF10372	TRANSISTOR PT493FL1	
Q2102	CF10372	TRANSISTOR PT493FL1	
Q2103	5326903	TRANSISTOR UN2213	
Q2104	5326903	TRANSISTOR UN2213	
Q2501	CA10672R	TRANSISTOR 2SD601A	
Q2502	CA10672R	TRANSISTOR 2SD601A	
Q2503	CA10672R	TRANSISTOR 2SD601A	
Q2504	5326903	TRANSISTOR UN2213	
Q2505	CA10672R	TRANSISTOR 2SD601A	
Q2506	5326903	TRANSISTOR UN2213	
Q2509	5327074	TRANSISTOR DTA144ES-T	
Q2901	CA10672R	TRANSISTOR 2SD601A	(615)

SYMBOL-NO	P-NO	DESCRIPTION	
Q4401	5328974	TRANSISTOR 2SC2412K	(617)
Q4402	5328974	TRANSISTOR 2SC2412K	(617)
Q4403	5328974	TRANSISTOR 2SC2412K	(617)
Q4404	5328964	TRANSISTOR 2SA1037KFRST	(617)
Q4405	5328974	TRANSISTOR 2SC2412K	(617)
Q4408	CA10733R	TRANSISTOR DTC144K (HEPM)	(617)
Q4411	5328964	TRANSISTOR 2SA1037KFRST	(617)
Q4412	5328974	TRANSISTOR 2SC2412K	(617)
Q4413	5328964	TRANSISTOR 2SA1037KFRST	(617)
Q4501	5328974	TRANSISTOR 2SC2412K	(617)
Q4502	5328974	TRANSISTOR 2SC2412K	(617)
Q4503	5328974	TRANSISTOR 2SC2412K	(617)
Q4601	5324631	TRANSISTOR 2SA1390C-T	(617)
Q4602	5327061	TRANSISTOR 2SC1740S-ST	(617)
Q4603	5327061	TRANSISTOR 2SC1740S-ST	(617)
Q4604	5324631	TRANSISTOR 2SA1390C	(617)
Q4605	5324631	TRANSISTOR 2SA1390C	(617)
Q4606	5324631	TRANSISTOR 2SA1390C-T	(617)
Q4607	5327061	TRANSISTOR 2SC1740S-ST	(617)
Q4608	5324631	TRANSISTOR 2SA1390C-T	(617)
ZD0851	5339251	DIODE HZS2-C3	
ZD0861	5336811	DIODE MA2180A	
ZD0862	5339268	DIODE HZS11B2	
ZD0864	5339482	DIODE HZS15B-2	
ZD0901	5339275	DIODE HZS7-B2	
ZD0903	5339297	DIODE HZS5C3	
ZD0904	5339297	DIODE HZS5C3	
ZD2501	5339288	DIODE HZS30-3	
ZD2502	5339296	DIODE HZS5B2	

TRANSFORMERS

SYMBOL-NO	P-NO	DESCRIPTION	
T0401	BT10251	TRANSFORMER, POWER	
⚠T0851	BT10321	TRANSFORMER, POWER (HEPM)	(A)
⚠T0851	BT10322	TRANSFORMER, POWER	(AW)

COILS

SYMBOL-NO	P-NO	DESCRIPTION	
L0202	0770057	CHOKE COIL 100UH+-5%	
L0203	5121288	COIL 15UH	
L0204	5121287	COIL 10UH	
L0205	0770057	CHOKE COIL 100UH+-5%	
L0206	5121569	COIL 82UH	
L0208	0770057	CHOKE COIL 100UH+-5%	
L0209	5159142	CHOKE COIL 12UH	
L0210	5159146	CHOKE COIL 27UH	
L0401	5159114	COIL 15mH	
L0403	0770057	CHOKE COIL 100UH+-5%	
L0501	0770048	CHOKE COIL 22UH+-5%	
L0502	0770057	CHOKE COIL 100UH+-5%	
⚠L0851	BV10241	FILTER, LINE	
L0853	BH00201R	COIL 10UH	
L0854	BH00205R	COIL 22UH	
L1101	0770057	CHOKE COIL 100UH+-5%	
L1102	0770057	CHOKE COIL 100UH+-5%	
L1103	0770057	CHOKE COIL 100UH+-5%	
L1105	5121296	COIL 220UH	
L1106	5159153	CHOKE COIL 82UH	
L1402	5121288	COIL 15UH	
L1403	5121284	COIL 3.3UH	
L1406	0770057	CHOKE COIL 100UH+-5%	
L1701	0770057	CHOKE COIL 100UH+-5%	
L1801	0770057	CHOKE COIL 100UH+-5%	
L2502	0770061	CHOKE COIL 180UH	
L2504	0770057	CHOKE COIL 100UH+-5%	
L2902	5121294	COIL 100UH	(615)
L2903	5121294	COIL 100UH	(615)
L4401	5121611	COIL	(617)
L4402	5121611	COIL	(617)
L4403	5121611	COIL	(617)
L4501	5121611	COIL	(617)
L4502	5121611	COIL	(617)
L4606	5159147	CHOKE COIL 33UH	(617)
L4607	0770057	CHOKE COIL 100UH+-5%	(617)
L4608	0770057	CHOKE COIL 100UH+-5%	(617)

CRYSTALS

SYMBOL-NO	P-NO	DESCRIPTION	
X0201	BP10531	CRYSTAL	
X0901	BP10571	CRYSTAL	
X0902	BP10251	CRYSTAL	
X2901	BP10461	CRYSTAL	(615)
X4401	BP10381R	CRYSTAL	(617)
X4501	BP10631	CRYSTAL (HEPM)	(617)

MISCELLANEOUS

SYMBOL-NO	P-NO	DESCRIPTION	
BL0851	5272378	LC FILTER	(A)
BL0851	5272379	LC FILTER	(AW)
BL0853	5272378	LC FILTER	(A)
BL0853	5272379	LC FILTER	(AW)
BL0861	5272378	LC FILTER	
BL0901	5272379	COIL	
BL0902	5274521	CORE, FERRITE	
BL4401	5272378	LC FILTER	(617)
BL4501	5272378	LC FILTER	(617)
⚠F0851	FN10201	FUSE 003A	
FE2501	5582216	TUNER IF UNIT	
⚠FH0851	5722412	HOLDER, FUSE	
⚠FH0852	5722412	HOLDER, FUSE	
IR1701	CJ10261	IR RECEIVER	
JK2501	ES10343	JACK	
JK2503	EQ10161	JACK	
LCD1701	DB10371	DISPLAY, LIQUID CRYSTAL (HEPM)	
LD2701	CH10181G	LED	
LMP1701	5763357	LAMP	(617)
LMP1701	5763358	BACK, LIGHT (HEPM)	(615)
LMP1702	5763357	LAMP	(617)
LMP1702	5763358	BACK, LIGHT (HEPM)	(615)
LMP1703	5763357	LAMP	(617)
LMP1703	5763358	BACK, LIGHT (HEPM)	(615)
LMP1704	5763357	LAMP	(617)
LMP1704	5763358	BACK, LIGHT (HEPM)	(615)
⚠PC0851	1322421	PHOTOCOUPLER PC817A	
⚠QF0851	5721945	IC PROTECTOR, ICP-N38	
⚠QF0852	5721946	PROTECTOR, ICP-N15	
S1710	5634884	SWITCH	(617)
S1711	5634884	SWITCH	(617)
S1712	5634884	SWITCH	(617)
S1713	5634884	SWITCH	(617)
S1714	5634884	SWITCH	
S1715	5634884	SWITCH	
S1719	5634884	SWITCH	
S1720	5634884	SWITCH	
S2101	FD10211	SWITCH, MODE	
S2102	5635631	SWITCH	
S2103	5635631	SWITCH	
S2701	5634884	SWITCH	
S2704	5634884	SWITCH	
S2707	5634884	SWITCH	

SYMBOL-NO	P-NO	DESCRIPTION
S2708	5634884	SWITCH
S2709	5634884	SWITCH
S2721	FH10271	SWITCH

SYMBOL-NO	P-NO	DESCRIPTION

CHAPTER 6 | SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

Applied Model : VT-UX615A,AW
VT-UX617A,AW

Cautions when using schematic diagrams

Caution for safety
The parts marked ⚠ are critical for safety. Be sure to use the specified parts to ensure safety when replacing them.

1. Values in schematic diagrams

The values, dielectric strength (power capacitance) and tolerances of the resistors (excluding variable resistors) and capacitors are indicated in the schematic diagrams using abbreviations.

〔Resistors〕

Item	Indication
Value	No indication .... Ω K .... kΩ M .... MΩ
Tolerance	No indication .... ± 5% (All tolerances other than ± 5% are indicated in the schematic diagrams)
Power capacitance	No indication .... 1/8W (1/16W for leadless resistors without indication) All capacitances other than the above are indicated in the schematic diagrams.

〔Capacitors〕

Item	Indication
Value	No indication .... μF P .... pF
Dielectric strength	No indication .... 50V (All dielectric strengths other than 50V are indicated in the schematic diagrams.)

〔Coils〕

Item	Indication
Value	μ .... μH m .... mH

2. Markings in schematic diagrams

1) Parts marked " ■ " with circuit numbers in the schematic diagrams are discrete parts.
2) Parts marked " ● " with circuit numbers in the schematic diagrams are leadless parts.

Cautions when using circuit board diagrams

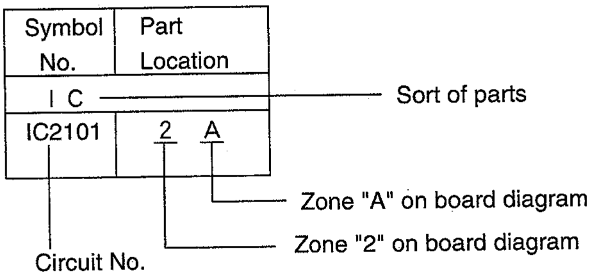
1. Identifications of sides A/B in circuit board diagrams

1) Board having a pattern on one side and parts on both sides.
   Side A : Shows discrete parts, viewed from the pattern side.
   Side B : Shows leadless parts, viewed from the pattern side.
2) Board having patterns on both sides and parts on both sides.
   Side A : Shows parts and patterns which can be seen when the case is opened.
   Side B : Shows parts and the pattern on the back of side A.

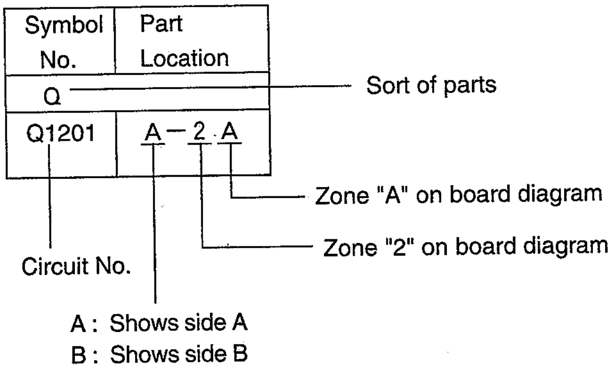
2. Table for indexing locations of parts

This table shows locations of each part on the circuit board diagrams. The locations are indicated using the guide scales on the external lines of diagrams.

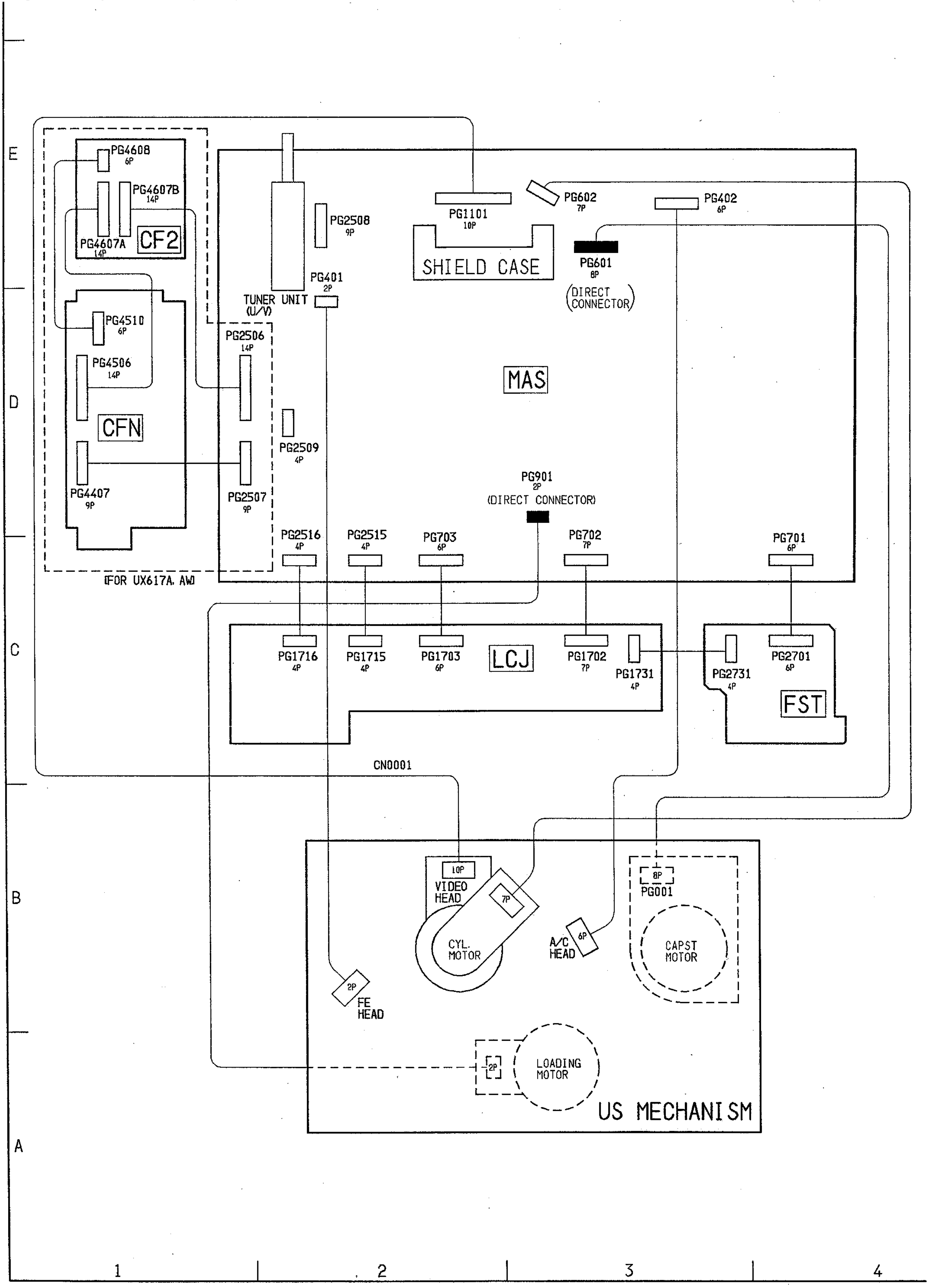
1) In case of one-layer board


Symbol No.
Part Location
I C
Sort of parts
IC2101
2 A
Zone "A" on board diagram
Zone "2" on board diagram
Circuit No.

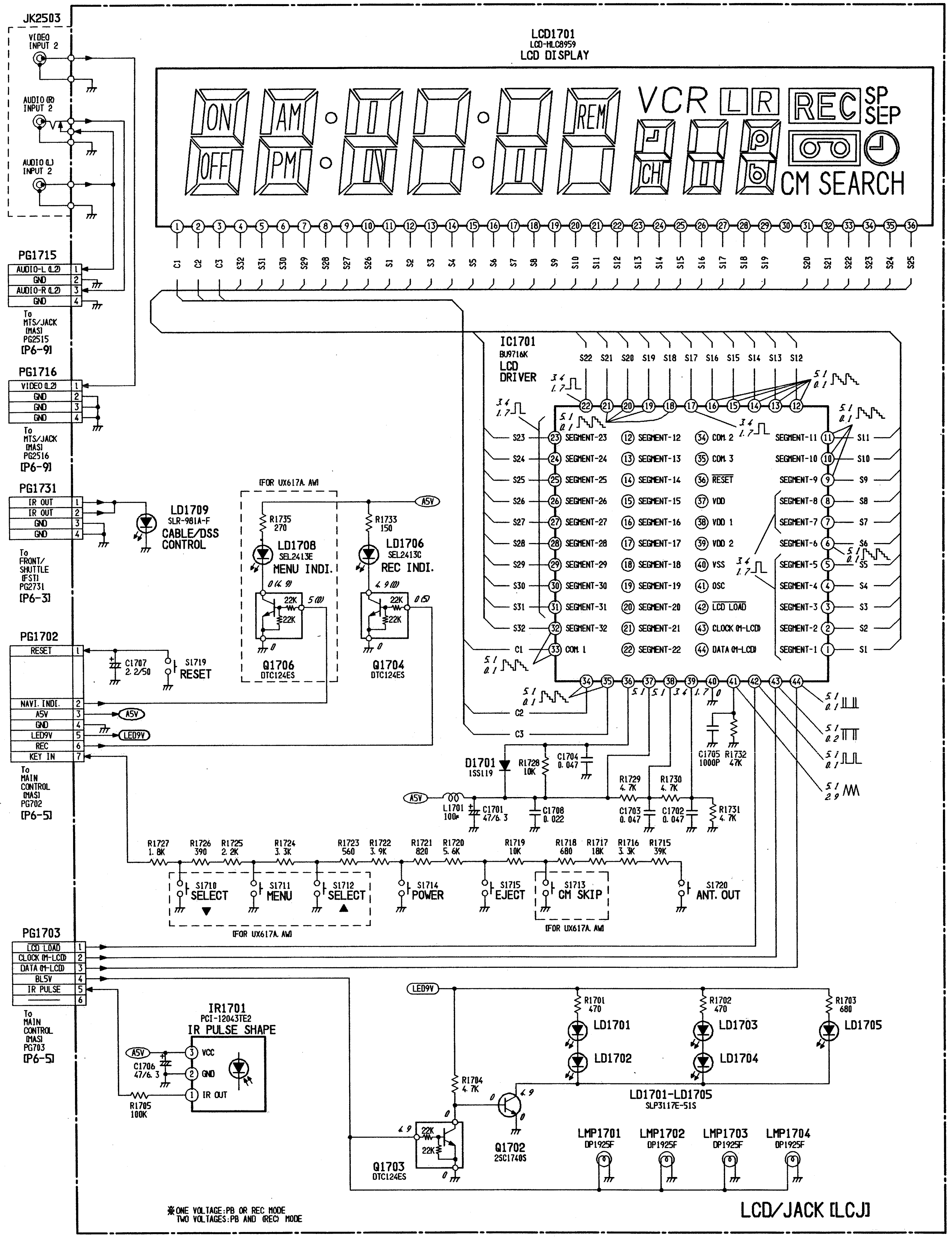
2) In case of side A/B indication board


Symbol No.
Part Location
Q
Sort of parts
Q1201
A − 2 A
Zone "A" on board diagram
Zone "2" on board diagram
Circuit No.
A : Shows side A
B : Shows side B

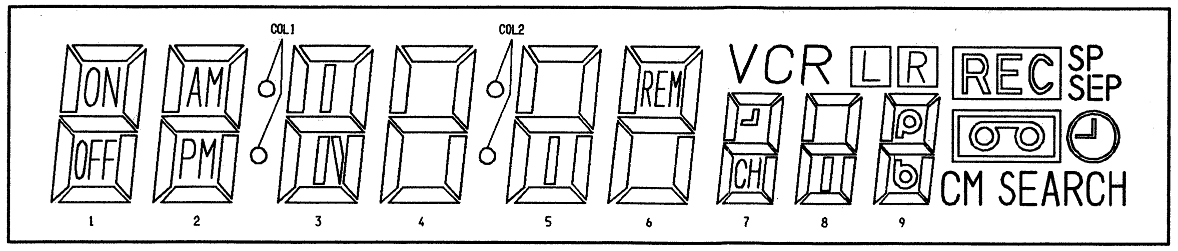
CONNECTION DIAGRAM


E
D
C
B
A
1
2
3
4
PG4608
6P
PG4607B
14P
PG4607A
14P
CF2
PG4510
6P
PG4506
14P
CFN
PG4407
9P
PG2506
14P
PG2507
9P
[FOR UX617A, AW]
TUNER UNIT
(U/V)
PG2508
9P
PG401
2P
PG2509
4P
PG1101
10P
SHIELD CASE
PG602
7P
PG402
6P
PG601
8P
(DIRECT CONNECTOR)
MAS
PG901
2P
(DIRECT CONNECTOR)
PG2516
4P
PG2515
4P
PG703
6P
PG702
7P
PG701
6P
PG1716
4P
PG1715
4P
PG1703
6P
LCJ
PG1702
7P
PG1731
4P
PG2731
4P
PG2701
6P
FST
CN0001
10P
VIDEO HEAD
7P
CYL. MOTOR
6P
A/C HEAD
8P
PG001
CAPST MOTOR
2P
FE HEAD
2P
LOADING MOTOR
US MECHANISM

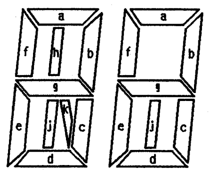
LCD/JACK [LCJ] SCHEMATIC DIAGRAM


JK2503
VIDEO INPUT 2
AUDIO (R) INPUT 2
AUDIO (L) INPUT 2
LCD1701
LCD-HLC8959
LCD DISPLAY
ON
OFF
AM
PM
REM
VCR
L
R
REC
SP
SEP
CH
CM SEARCH
PG1715
AUDIO-L (L2)
GND
AUDIO-R (L2)
To MTS/JACK (MAS) PG2515 [P6-9]
PG1716
VIDEO (L2)
To MTS/JACK (MAS) PG2516 [P6-9]
PG1731
IR OUT
To FRONT/SHUTTLE (FST) PG2731 [P6-3]
LD1709
SLR-981A-F
CABLE/DSS CONTROL
(FOR UX617A AW)
R1735 270
LD1708
SEL2413E
MENU INDI.
R1733 150
LD1706
SEL2413C
REC INDI.
Q1706
DTC124ES
Q1704
DTC124ES
IC1701
BU9716K
LCD DRIVER
PG1702
RESET
NAVI. INDI.
A5V
LED9V
REC
KEY IN
To MAIN CONTROL (MAS) PG702 [P6-5]
C1707 2.2/50
S1719 RESET
D1701 1SS119
R1728 10K
C1704 0.047
R1729 4.7K
R1730 4.7K
C1705 1000P
R1732 47K
L1701 100μ
C1701 47/6.3
C1708 0.022
C1703 0.047
C1702 0.047
R1731 4.7K
R1727 1.8K
R1726 390
R1725 2.2K
R1724 3.3K
R1723 560
R1722 3.9K
R1721 820
R1720 5.6K
R1719 10K
R1718 680
R1717 18K
R1716 3.3K
R1715 39K
S1710 SELECT ▼
S1711 MENU
S1712 SELECT ▲
S1714 POWER
S1715 EJECT
S1713 CM SKIP
S1720 ANT. OUT
(FOR UX617A AW)
PG1703
LCD LOAD
CLOCK (M-LCD)
DATA (M-LCD)
BL5V
IR PULSE
To MAIN CONTROL (MAS) PG703 [P6-5]
IR1701
PCI-12043TE2
IR PULSE SHAPE
VCC
GND
IR OUT
C1706 47/6.3
R1705 100K
R1704 4.7K
Q1703 DTC124ES
Q1702 2SC1740S
R1701 470
R1702 470
R1703 680
LD1701
LD1702
LD1703
LD1704
LD1705
LD1701-LD1705
SLP3117E-51S
LMP1701 DP1925F
LMP1702 DP1925F
LMP1703 DP1925F
LMP1704 DP1925F
※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE
LCD/JACK [LCJ]

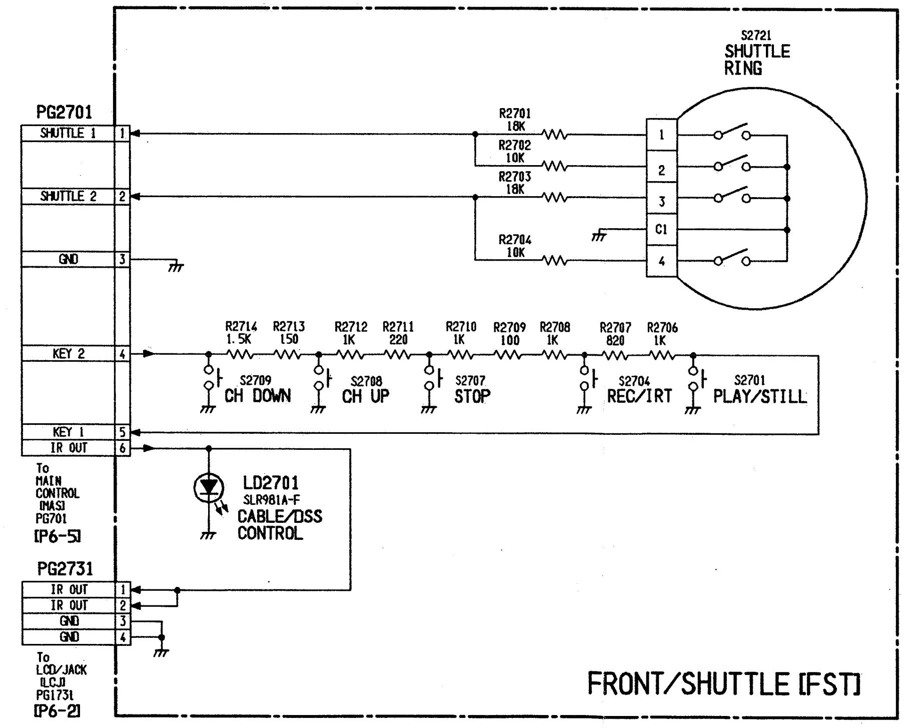
LCD GRID TABLE


COL1
COL2
ON
OFF
AM
PM
REM
VCR
L
R
REC
SP
SEP
CH
CM SEARCH
1
2
3
4
5
6
7
8
9

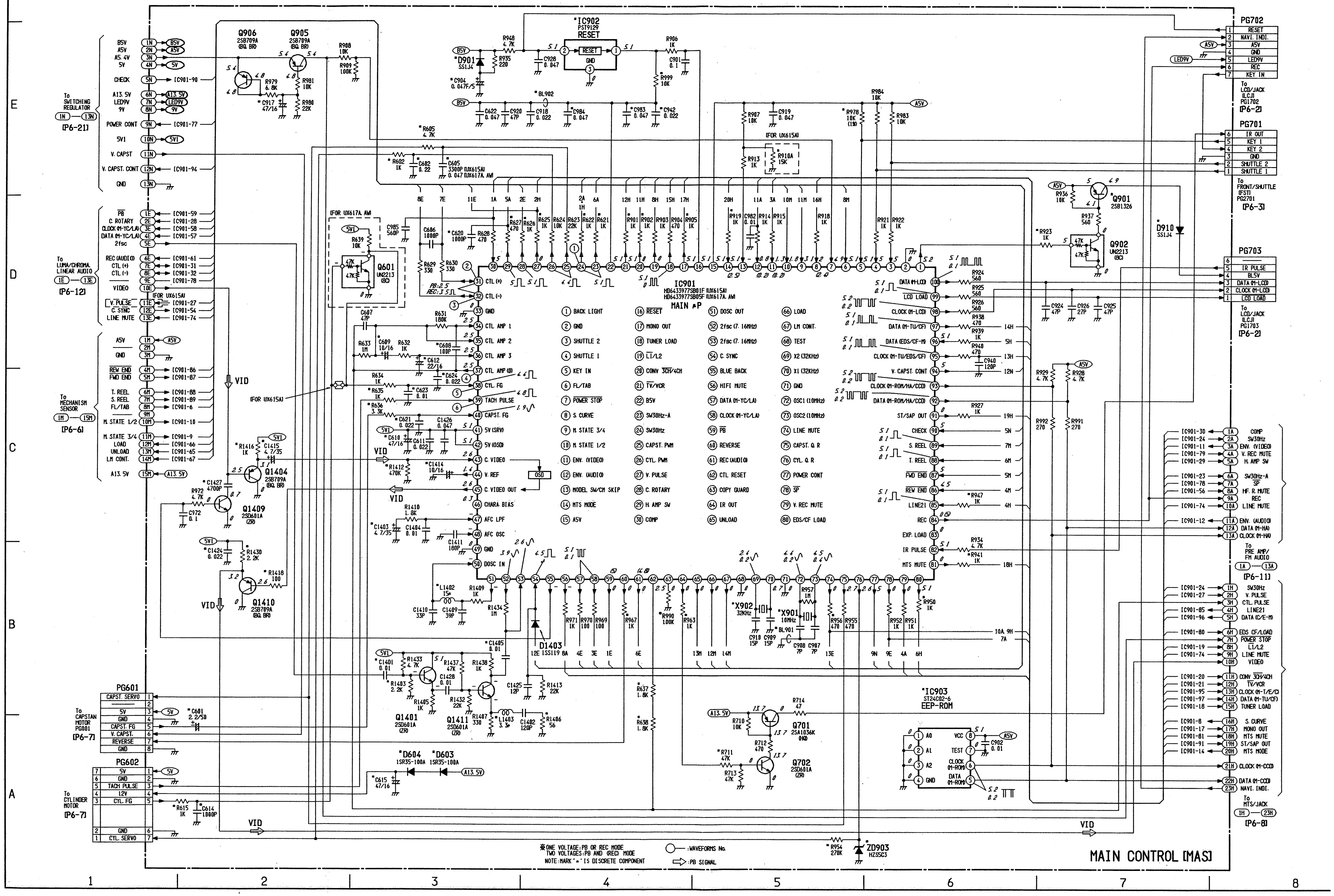
PIN No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
COM1	COM1	—	—	1adef	OFF	2d	PM	2c	3e	3g	3d	3c	4e	4d	5e	5i	5d	6e
COM2	—	COM2	—	1g	1bc	2e	2g	2b	3f	3hi	3k	3b	4g	4c	5f	5g	5c	6f
COM3	—	—	COM3	ON	2a	2f	AM	COL1	—	3a	—	4f	4a	4b	COL2	5a	5b	6a
PIN No.	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
COM1	6d	6c	7d	CH	7c	8d	8i	8c	9d	9g	9c	N. C	—	SP	S	—	—	N. C
COM2	6g	6b	7e	7g	7b	8e	8g	8b	9e	p b	9b		🖭	—	LP	🕒	CM SEARCH	
COM3	REM	VCR	7f	┘	7a	8f	8a	L	9f	9a	R		REC	—	=	—	—	



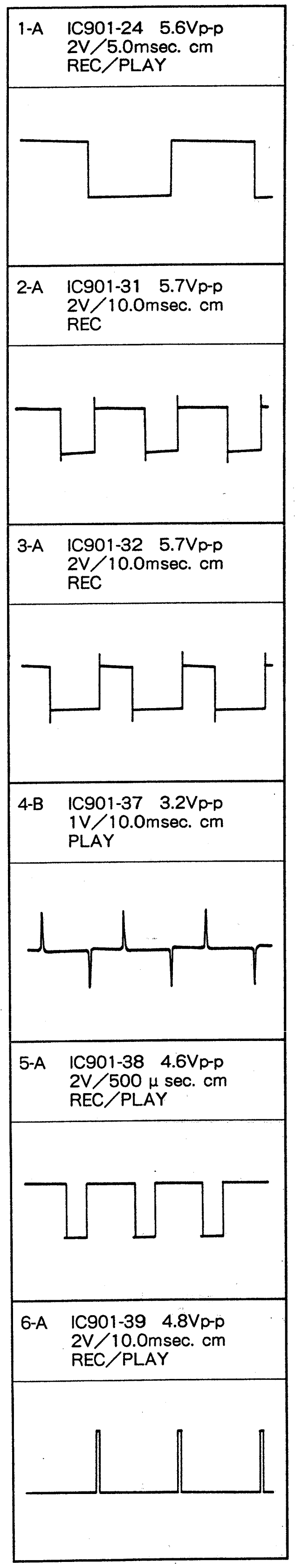
FRONT/SHUTTLE [FST] SCHEMATIC DIAGRAM


S2721
SHUTTLE RING
PG2701
SHUTTLE 1
SHUTTLE 2
GND
KEY 2
KEY 1
IR OUT
To MAIN CONTROL (MAS) PG701 [P6-5]
R2701 18K
R2702 10K
R2703 18K
R2704 10K
C1
R2714 1.5K
R2713 150
R2712 1K
R2711 220
R2710 1K
R2709 100
R2708 1K
R2707 820
R2706 1K
S2709 CH DOWN
S2708 CH UP
S2707 STOP
S2704 REC/IRT
S2701 PLAY/STILL
LD2701
SLR981A-F
CABLE/DSS CONTROL
PG2731
IR OUT
GND
To LCD/JACK (LCJ) PG1731 [P6-2]
FRONT/SHUTTLE [FST]

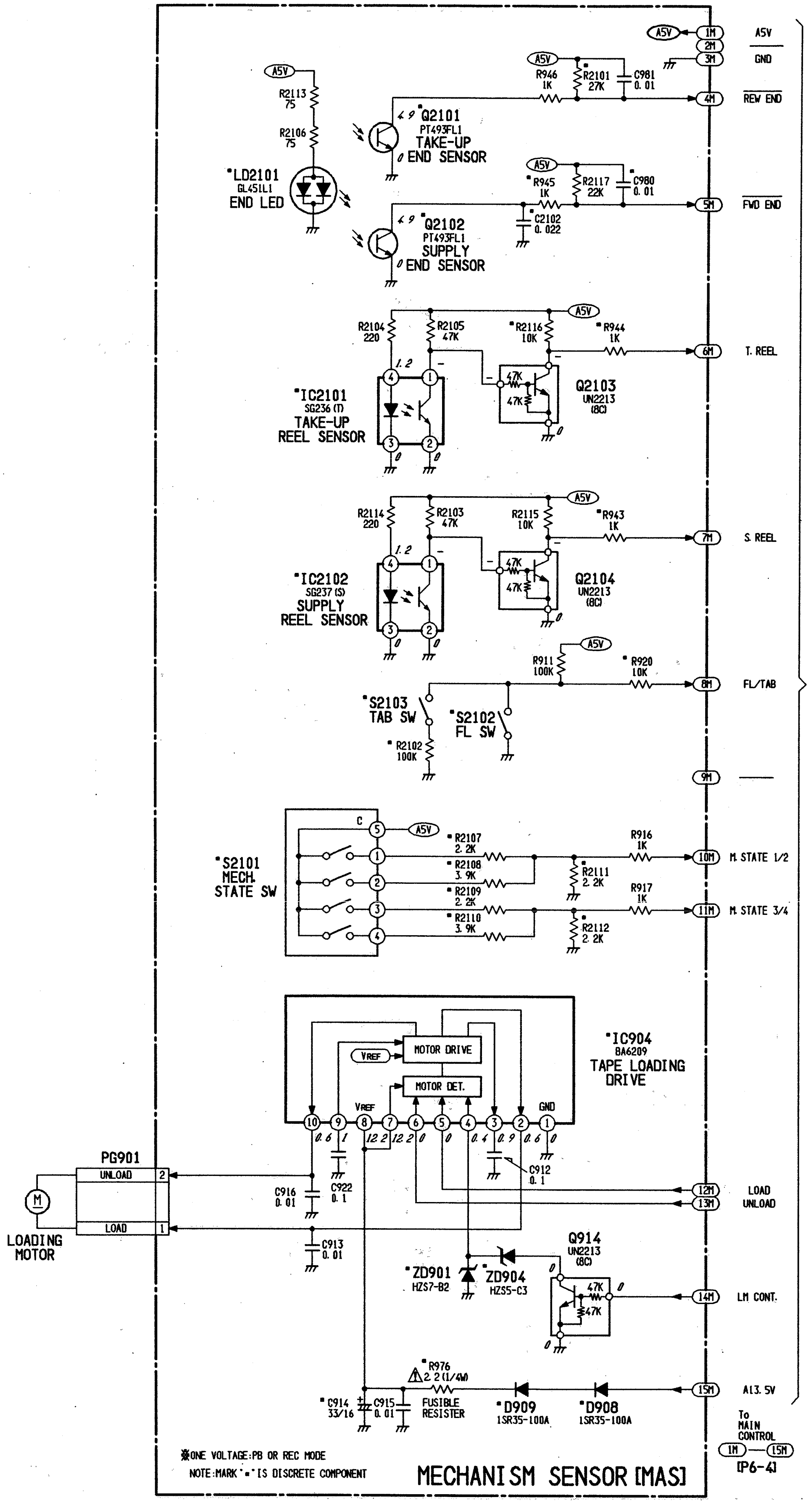
MAIN CONTROL [MAS] SCHEMATIC DIAGRAM


IC901
HD6433977SB01F (UX615A)
HD6433977SB05F (UX617A, AW)
MAIN µP
① BACK LIGHT
② GND
③ SHUTTLE 2
④ SHUTTLE 1
⑤ KEY IN
⑥ FL/TAB
⑦ POWER STOP
⑧ S. CURVE
⑨ M. STATE 3/4
⑩ M. STATE 1/2
⑪ ENV. (VIDEO)
⑫ ENV. (AUDIO)
⑬ MODEL SW/CH SKIP
⑭ MTS MODE
⑮ A5V
⑯ RESET
⑰ MONO OUT
⑱ TUNER LOAD
⑲ LI/L2
⑳ CONV 3CH/4CH
(21) TV/VCR
(22) B5V
(23) SW30Hz-A
(24) SW30Hz
(25) CAPST. PWM
(26) CYL. PWM
(27) V. PULSE
(28) C. ROTARY
(29) H. AMP SW
(30) COMP
(51) DOSC OUT
(52) 2fsc (7.16MHz)
(53) 2fsc (7.16MHz)
(54) C. SYNC
(55) BLUE BACK
(56) HIFI MUTE
(57) DATA (M-YC/LA)
(58) CLOCK (M-YC/LA)
(59) PB
(60) REVERSE
(61) REC (AUDIO)
(62) CTL RESET
(63) COPY GUARD
(64) IR OUT
(65) UNLOAD
(66) LOAD
(67) LM CONT.
(68) TEST
(69) X2 (32KHz)
(70) X1 (32KHz)
(71) GND
(72) OSC1 (10MHz)
(73) OSC2 (10MHz)
(74) LINE MUTE
(75) CAPST. Q R
(76) CYL. Q R
(77) POWER CONT
(78) SP
(79) V. REC MUTE
(80) EDS/CF LOAD
IC902 PST9129 RESET
IC903 ST24C02-6 EEP-ROM
Q906 2SB709A
Q905 2SB709A
Q901 2SB1326
Q902 UN2213
Q601 UN2213
Q1404 2SB709A
Q1409 2SD601A
Q1410 2SB709A
Q1401 2SD601A
Q1411 2SD601A
Q701 2SA1036K
Q702 2SD601A
D901 SS1J4
D910 SS1J4
D1403 1SS119
D604 1SR35-100A
D603 1SR35-100A
ZD903 HZS5C3
X902 32KHz
X901 10MHz
To SWITCHING REGULATOR (1N)—(13N) [P6-21]
To LUMA/CHROMA, LINEAR AUDIO (1E)—(13E) [P6-12]
To MECHANISM SENSOR (1M)—(15M) [P6-6]
To CAPSTAN MOTOR PG001 [P6-7]
To CYLINDER MOTOR [P6-7]
PG601
PG602
PG702
To LCD/JACK (LCJ) PG1702 [P6-2]
PG701
To FRONT/SHUTTLE (FST) PG2701 [P6-3]
PG703
To LCD/JACK (LCJ) PG1703 [P6-2]
To PRE AMP/FM AUDIO (1A)—(13A) [P6-11]
To MTS/JACK (1H)—(23H) [P6-8]
VID
※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE
NOTE:MARK "*" IS DISCRETE COMPONENT
○ :WAVEFORMS No.
⇨ :PB SIGNAL
MAIN CONTROL [MAS]
1
2
3
4
5
6
7
8
E
D
C
B
A

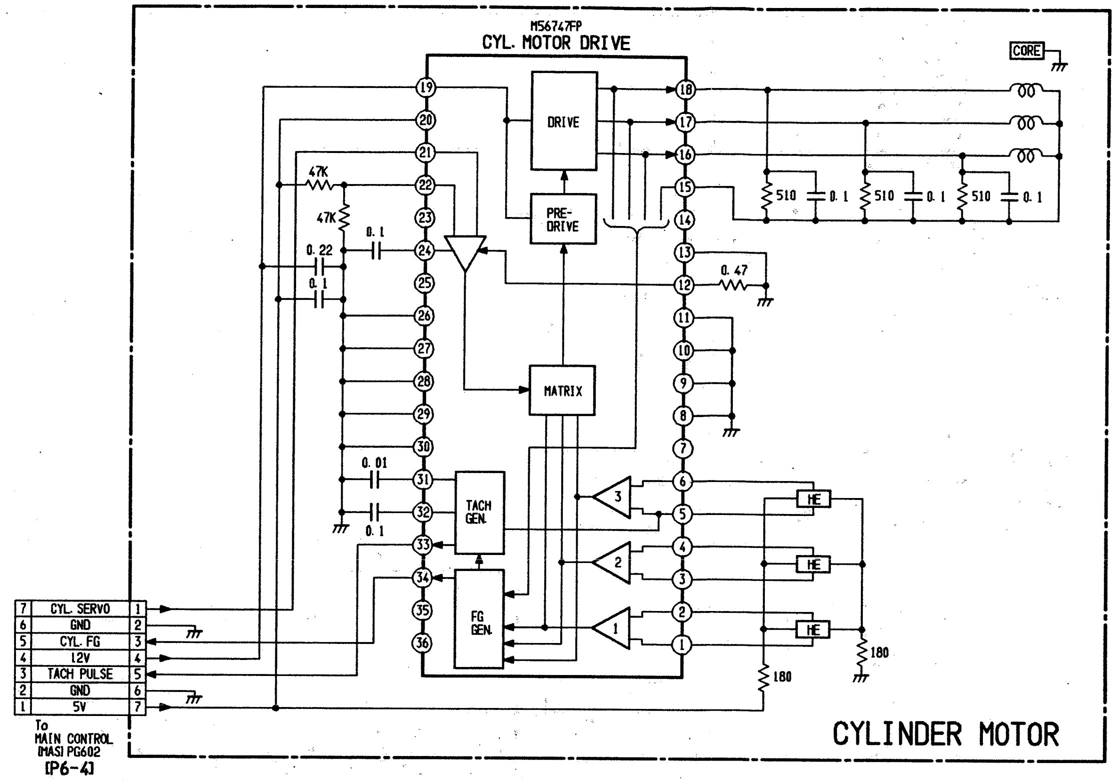
SERVO WAVEFORMS



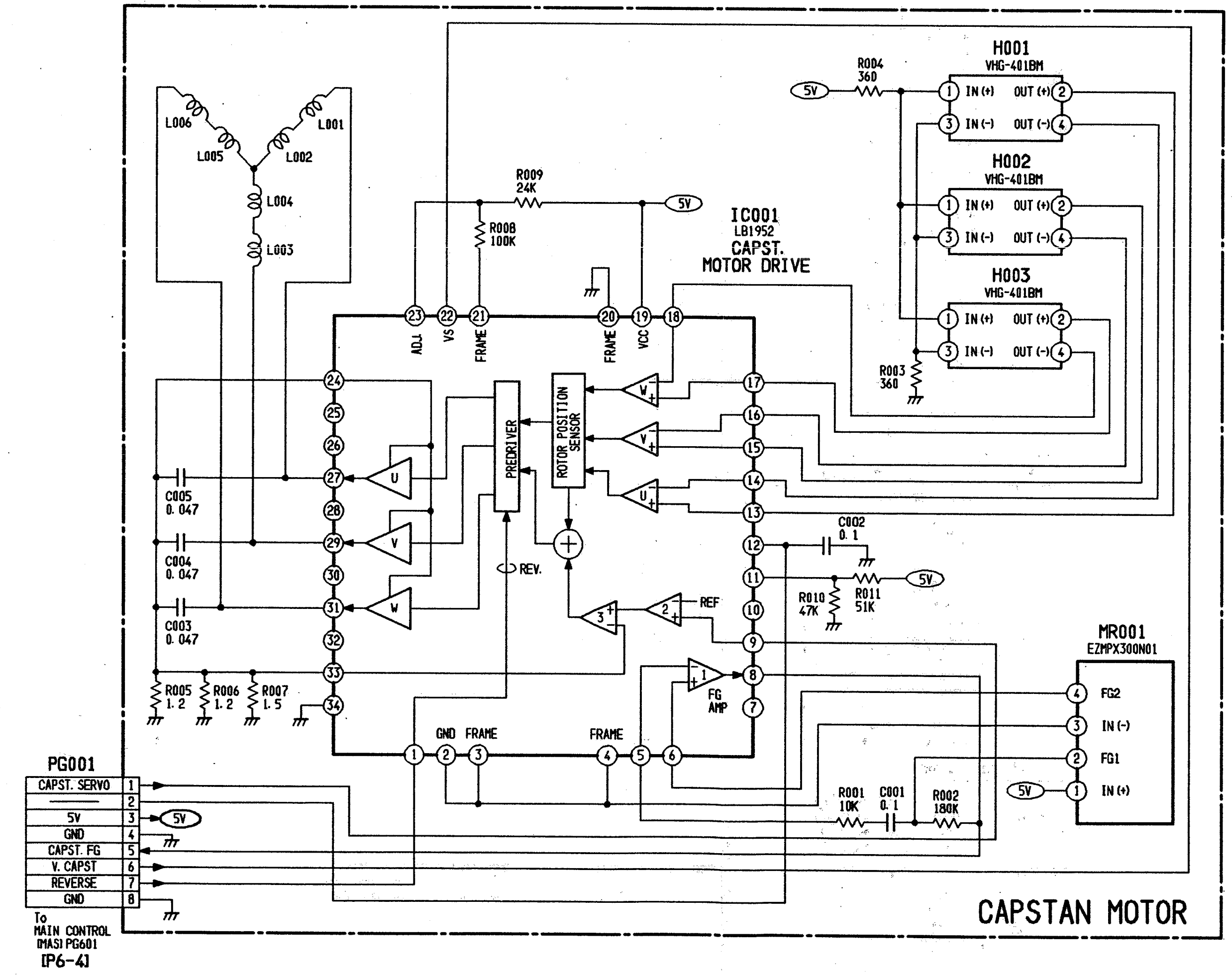
MECHANISM SENSOR [MAS] SCHEMATIC DIAGRAM


A5V
GND
REW END
FWD END
T. REEL
S. REEL
FL/TAB
M. STATE 1/2
M. STATE 3/4
LOAD
UNLOAD
LM CONT.
A13. 5V
To MAIN CONTROL
[P6-4]
Q2101
PT493FL1
TAKE-UP END SENSOR
Q2102
PT493FL1
SUPPLY END SENSOR
LD2101
GL451L1
END LED
IC2101
SG236 (T)
TAKE-UP REEL SENSOR
IC2102
SG237 (S)
SUPPLY REEL SENSOR
Q2103
UN2213
Q2104
UN2213
S2103
TAB SW
S2102
FL SW
S2101
MECH. STATE SW
IC904
BA6209
TAPE LOADING DRIVE
MOTOR DRIVE
MOTOR DET.
VREF
PG901
UNLOAD
LOAD
LOADING MOTOR
ZD901
HZS7-B2
ZD904
HZS5-C3
Q914
UN2213
R976
2.2 (1/4W)
FUSIBLE RESISTER
D909
1SR35-100A
D908
1SR35-100A
※ONE VOLTAGE:PB OR REC MODE
NOTE:MARK "*" IS DISCRETE COMPONENT
MECHANISM SENSOR [MAS]

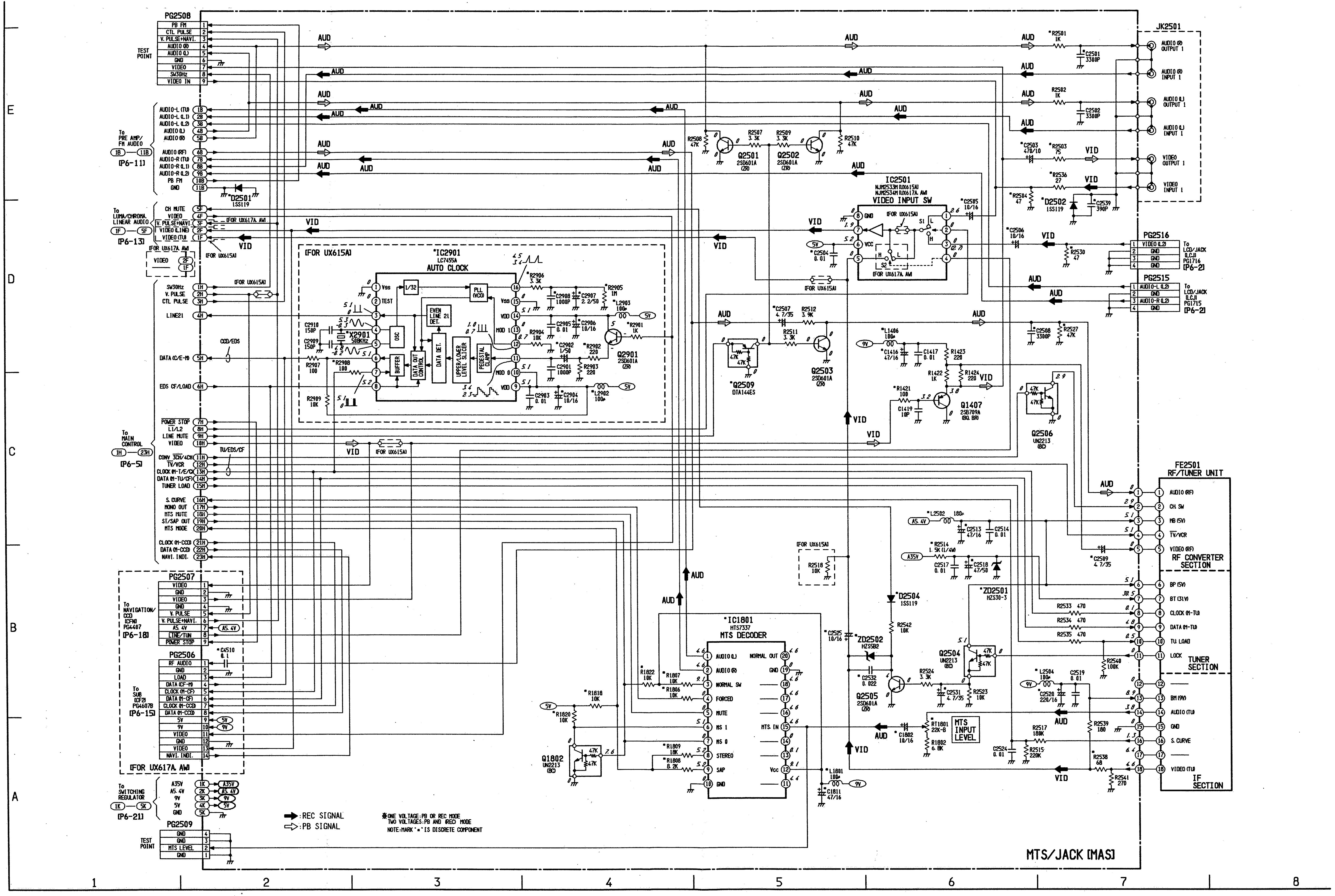
CYLINDER MOTOR SCHEMATIC DIAGRAM


M56747FP
CYL. MOTOR DRIVE
DRIVE
PRE-DRIVE
MATRIX
TACH GEN.
FG GEN.
CORE
HE
CYL. SERVO
GND
CYL. FG
12V
TACH PULSE
GND
5V
To MAIN CONTROL [MAS] PG602
[P6-4]
CYLINDER MOTOR

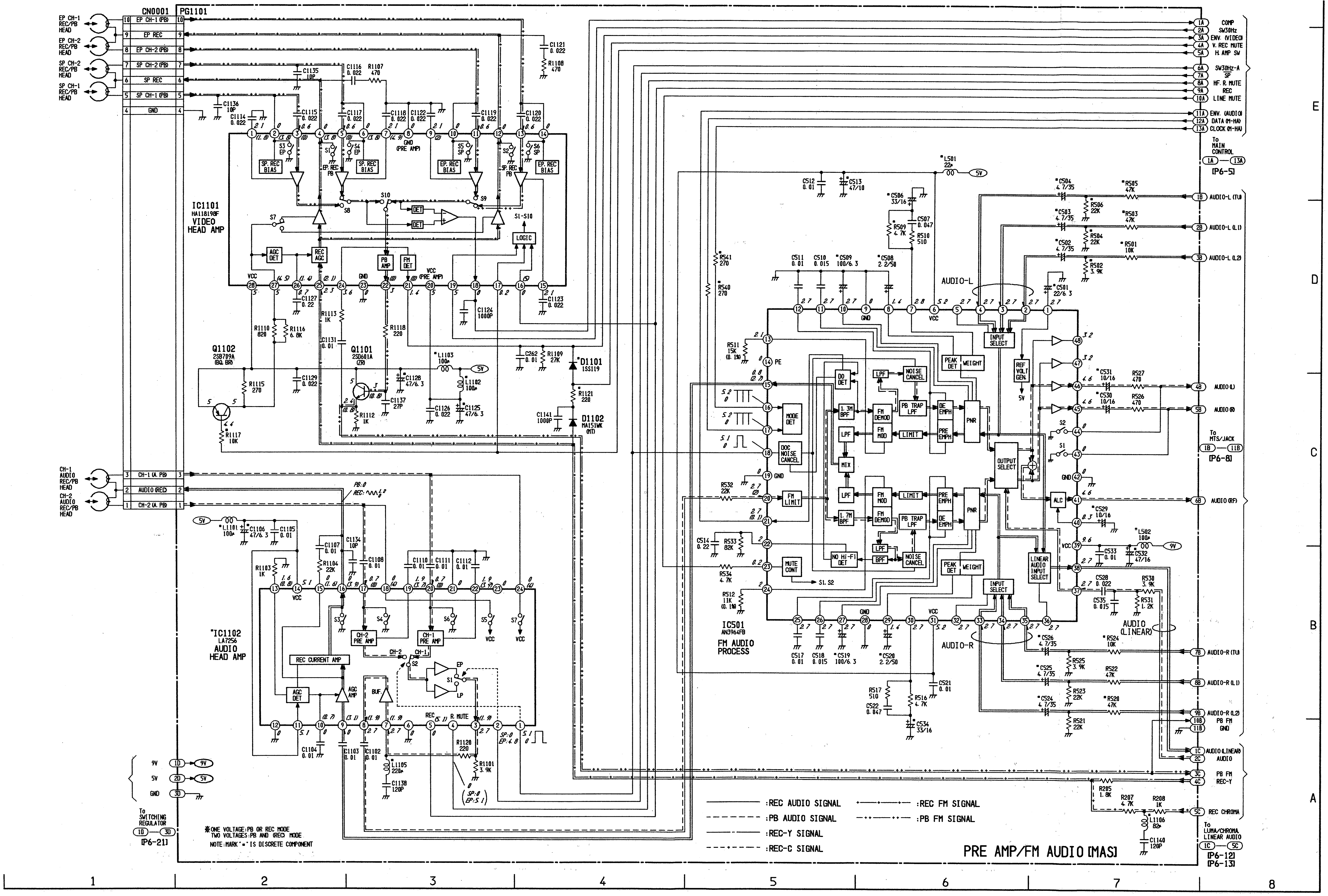
CAPSTAN MOTOR SCHEMATIC DIAGRAM


IC001
LB1952
CAPST. MOTOR DRIVE
H001
VHG-401BM
H002
VHG-401BM
H003
VHG-401BM
PREDRIVER
ROTOR POSITION SENSOR
REV.
REF
FG AMP
MR001
EZMPX300N01
FG2
IN(-)
FG1
IN(+)
PG001
CAPST. SERVO
5V
GND
CAPST. FG
V. CAPST
REVERSE
GND
To MAIN CONTROL [MAS] PG601
[P6-4]
CAPSTAN MOTOR

MTS/JACK [MAS] SCHEMATIC DIAGRAM


PG2508
TEST POINT
To PRE AMP/ FM AUDIO
[P6-11]
To LUMA/CHROMA LINEAR AUDIO
[P6-13]
To MAIN CONTROL
[P6-5]
PG2507
To NAVIGATION/ CCD (CFN) PG4407
[P6-18]
PG2506
To SUB (CF2) PG4607B
[P6-15]
[FOR UX617A AW]
To SWITCHING REGULATOR
[P6-21]
PG2509
TEST POINT
[FOR UX615A]
IC2901
LC7455A
AUTO CLOCK
Q2901
2SD601A
IC1801
HTS7337
MTS DECODER
Q1802
UN2213
Q2501
2SD601A
Q2502
2SD601A
IC2501
NJM2533M (UX615A)
NJM2534M (UX617A AW)
VIDEO INPUT SW
Q2503
2SD601A
Q2509
DTA144ES
Q1407
2SB709A
Q2506
UN2213
Q2504
UN2213
Q2505
2SD601A
D2504
ZD2502
ZD2501
HZS30-3
JK2501
AUDIO (R) OUTPUT 1
AUDIO (R) INPUT 1
AUDIO (L) OUTPUT 1
AUDIO (L) INPUT 1
VIDEO OUTPUT 1
VIDEO INPUT 1
PG2516
To LCD/JACK (LCJ) PG1716
[P6-2]
PG2515
To LCD/JACK (LCJ) PG1715
[P6-2]
FE2501
RF/TUNER UNIT
RF CONVERTER SECTION
TUNER SECTION
IF SECTION
MTS INPUT LEVEL
AUD
VID
:REC SIGNAL
:PB SIGNAL
※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE
NOTE:MARK "*" IS DISCRETE COMPONENT
MTS/JACK [MAS]
1
2
3
4
5
6
7
8
A
B
C
D
E

PRE AMP/FM AUDIO [MAS] SCHEMATIC DIAGRAM


CN0001
PG1101
EP CH-1 REC/PB HEAD
EP CH-2 REC/PB HEAD
SP CH-2 REC/PB HEAD
SP CH-1 REC/PB HEAD
EP CH-1 (PB)
EP REC
EP CH-2 (PB)
SP CH-2 (PB)
SP REC
SP CH-1 (PB)
GND
IC1101
HA118198F
VIDEO HEAD AMP
SP. REC BIAS
EP. REC BIAS
AGC DET
REC AGC
PB AMP
FM DET
LOGIC
S1-S10
Q1102
2SB709A
Q1101
2SD601A
D1101
1SS119
D1102
MA151WK
CH-1 AUDIO REC/PB HEAD
CH-2 AUDIO REC/PB HEAD
CH-1 (A. PB)
AUDIO (REC)
CH-2 (A. PB)
IC1102
LA7256
AUDIO HEAD AMP
REC CURRENT AMP
AGC DET
AGC AMP
BUF.
CH-2 PRE AMP
CH-1 PRE AMP
EP
LP
IC501
AN3964FB
FM AUDIO PROCESS
AUDIO-L
AUDIO-R
INPUT SELECT
REF VOLT GEN.
PEAK DET
WEIGHT
NOISE CANCEL
LPF
DO DET
1.3M BPF
1.7M BPF
FM DEMOD
FM MOD
PB TRAP LPF
DE EMPH
PRE EMPH
PNR
LIMIT
MIX
MODE DET
DOC NOISE CANCEL
FM LIMIT
NO HI-FI DET
BPF
MUTE CONT
OUTPUT SELECT
ALC
LINEAR AUDIO INPUT SELECT
AUDIO (LINEAR)
1A COMP
2A SW30Hz
3A ENV. (VIDEO)
4A V. REC MUTE
5A H. AMP SW
6A SW30Hz-A
7A SP
8A HF. R. MUTE
9A REC
10A LINE MUTE
11A ENV. (AUDIO)
12A DATA (M-HA)
13A CLOCK (M-HA)
To MAIN CONTROL 1A — 13A [P6-5]
1B AUDIO-L (TU)
2B AUDIO-L (L1)
3B AUDIO-L (L2)
4B AUDIO (L)
5B AUDIO (R)
To MTS/JACK 1B — 11B [P6-8]
6B AUDIO (RF)
7B AUDIO-R (TU)
8B AUDIO-R (L1)
9B AUDIO-R (L2)
10B PB FM
11B GND
1C AUDIO (LINEAR)
2C AUDIO
3C PB FM
4C REC-Y
5C REC CHROMA
To LUMA/CHROMA, LINEAR AUDIO 1C — 5C [P6-12] [P6-13]
9V
5V
GND
To SWITCHING REGULATOR 1D — 3D [P6-21]
PB:0 REC:
SP:0 EP:4.8
SP:0 EP:5.1
1 2 3 4 5 6 7 8
A B C D E

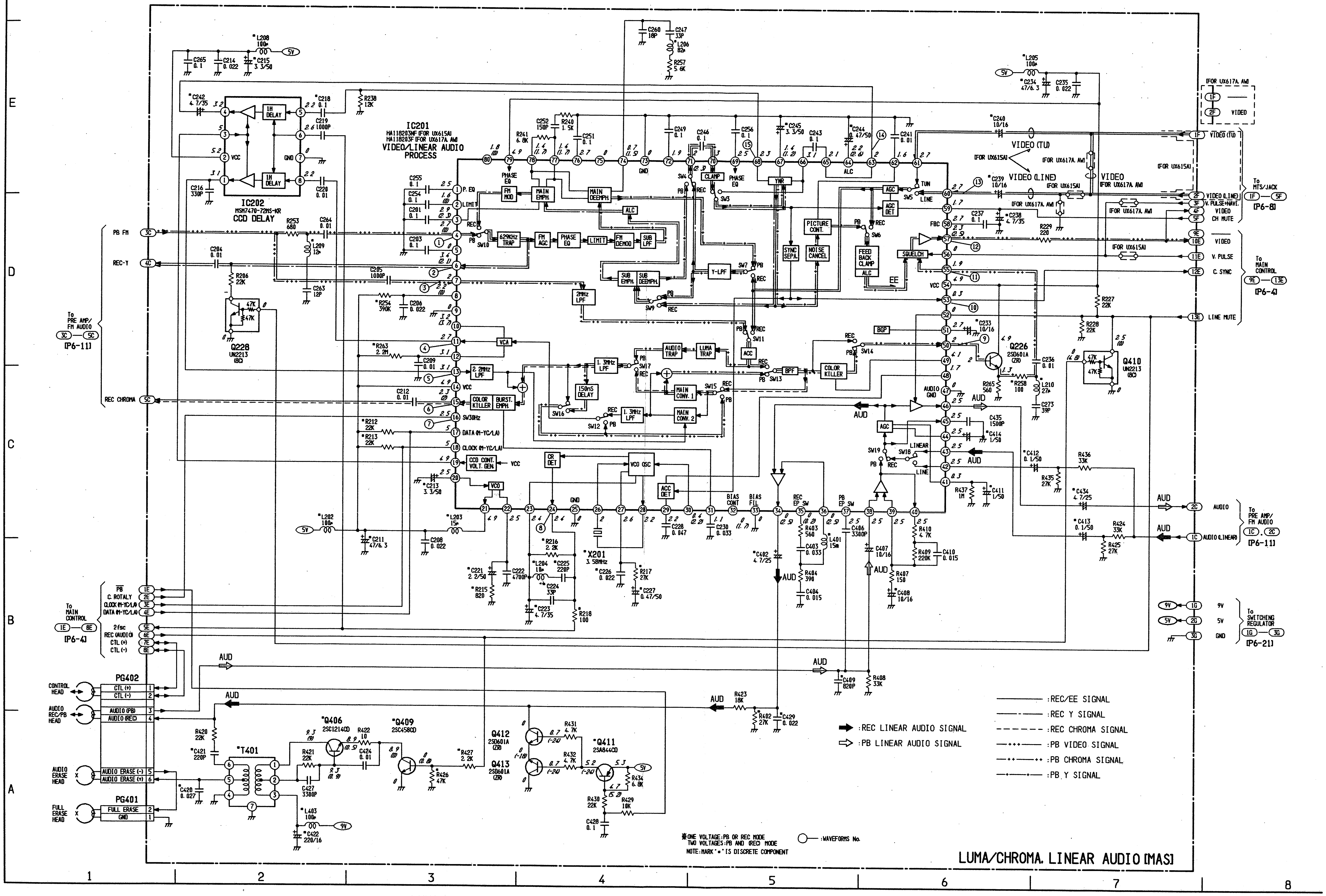
———— :REC AUDIO SIGNAL
– – – – :PB AUDIO SIGNAL
———— :REC-Y SIGNAL
– - – - :REC-C SIGNAL
—•—•— :REC FM SIGNAL
–••–••– :PB FM SIGNAL

※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE

NOTE:MARK "*" IS DISCRETE COMPONENT

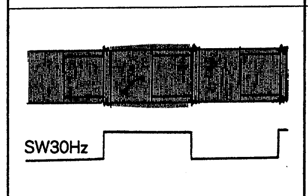
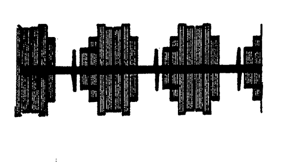
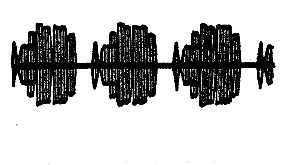
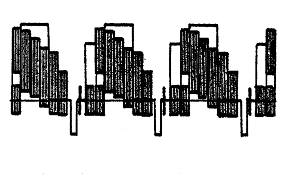
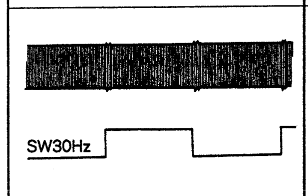
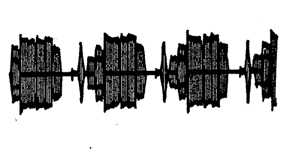
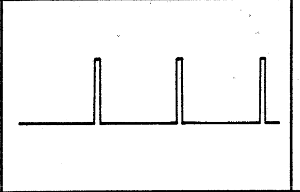
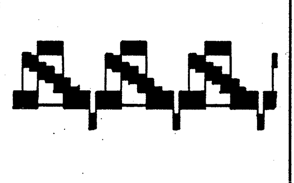
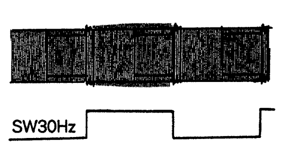
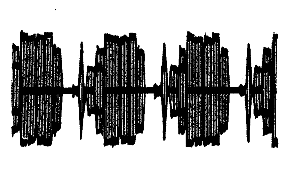
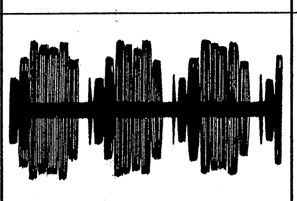
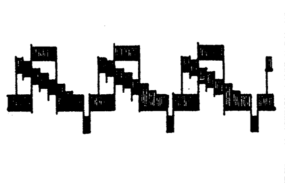
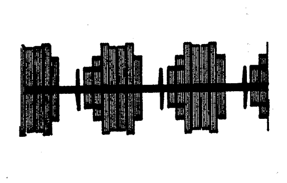
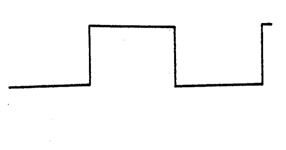
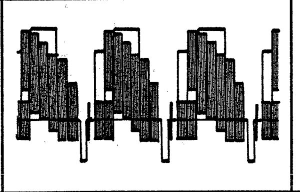
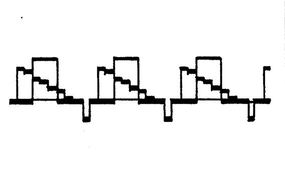
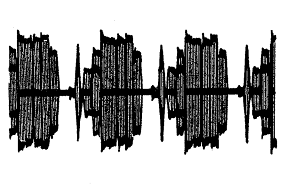
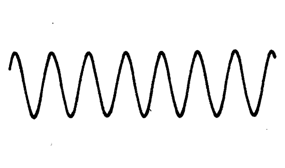
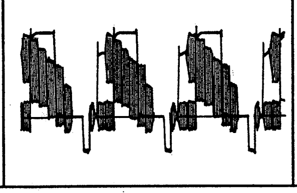
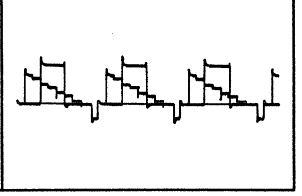
PRE AMP/FM AUDIO [MAS]

LUMA/CHROMA, LINEAR AUDIO [MAS] SCHEMATIC DIAGRAM

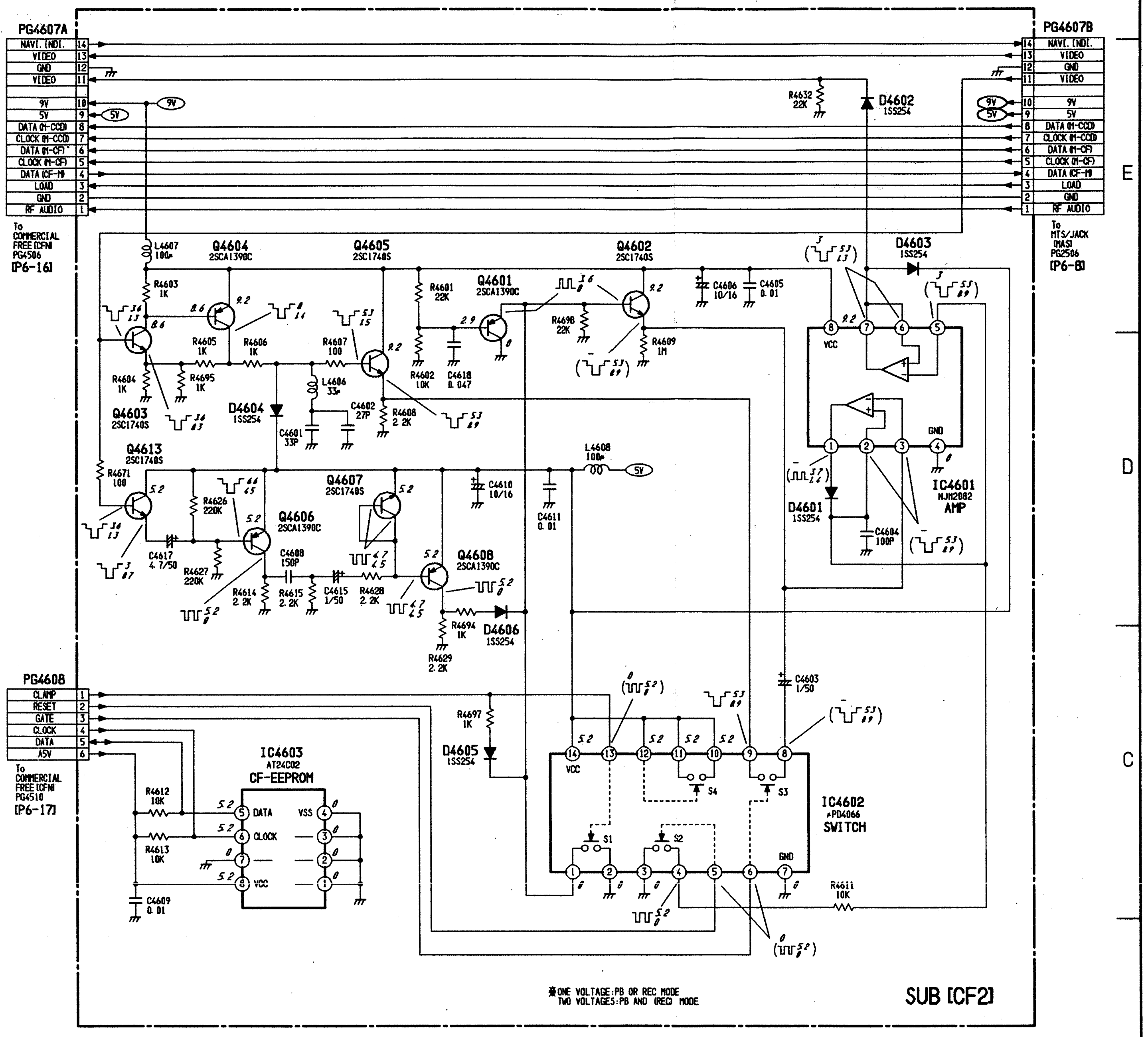


IC201
HA118203NF (FOR UX615A)
HA118203F (FOR UX617A AW)
VIDEO/LINEAR AUDIO PROCESS
IC202
MSM7470-72MS-KR
CCD DELAY
1H DELAY
Q226 2SD601A
Q228 UN2213
Q410 UN2213
Q406 2SC1214(C)
Q409 2SC458(C)
Q411 2SA844(C)
Q412 2SD601A
Q413 2SD601A
T401
X201 3.58MHz
PG402
PG401
CONTROL HEAD
AUDIO REC/PB HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
CTL (+)
CTL (-)
AUDIO (PB)
AUDIO (REC)
AUDIO ERASE (-)
AUDIO ERASE (+)
FULL ERASE
GND
PB FM
REC-Y
REC CHROMA
To PRE AMP/FM AUDIO 3C - 5C [P6-11]
To MAIN CONTROL 1E - 8E [P6-4]
PB
C. ROTALY
CLOCK (H-YC/LA)
DATA (H-YC/LA)
2fsc
REC (AUDIO)
CTL (+)
CTL (-)
[FOR UX617A AW]
VIDEO (TU)
VIDEO (LINE)
V. PULSE+NAVI.
VIDEO CH MUTE
To MTS/JACK 1F - 5F [P6-8]
VIDEO
V. PULSE
C. SYNC
LINE MUTE
To MAIN CONTROL 9E - 13E [P6-4]
AUDIO
AUDIO (LINEAR)
To PRE AMP/FM AUDIO 1C, 2C [P6-11]
9V
5V
GND
To SWITCHING REGULATOR 1G - 3G [P6-21]
FM MOD
MAIN EMPH
MAIN DEEMPH
629KHz TRAP
FM AGC
PHASE EQ
LIMIT
FM DEMOD
SUB LPF
ALC
SUB EMPH
SUB DEEMPH
Y-LPF
2MHz LPF
VCA
AUDIO TRAP
LUMA TRAP
1.3MHz LPF
2.2MHz LPF
150nS DELAY
COLOR KILLER
BURST EMPH
MAIN CONV. 1
MAIN CONV. 2
ACC
BPF
CCD CONT. VOLT. GEN.
VCO
CR DET
VCO OSC
ACC DET
CLAMP
YNR
SYNC SEPA.
NOISE CANCEL
PICTURE CONT.
FEED BACK CLAMP
AGC
AGC DET
SQUELCH
BGP
AUD
:REC/EE SIGNAL
:REC Y SIGNAL
:REC CHROMA SIGNAL
:PB VIDEO SIGNAL
:PB CHROMA SIGNAL
:PB Y SIGNAL
:REC LINEAR AUDIO SIGNAL
:PB LINEAR AUDIO SIGNAL
※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE
NOTE:MARK "*" IS DISCRETE COMPONENT
:WAVEFORMS No.
LUMA/CHROMA, LINEAR AUDIO [MAS]
1
2
3
4
5
6
7
8
A
B
C
D
E

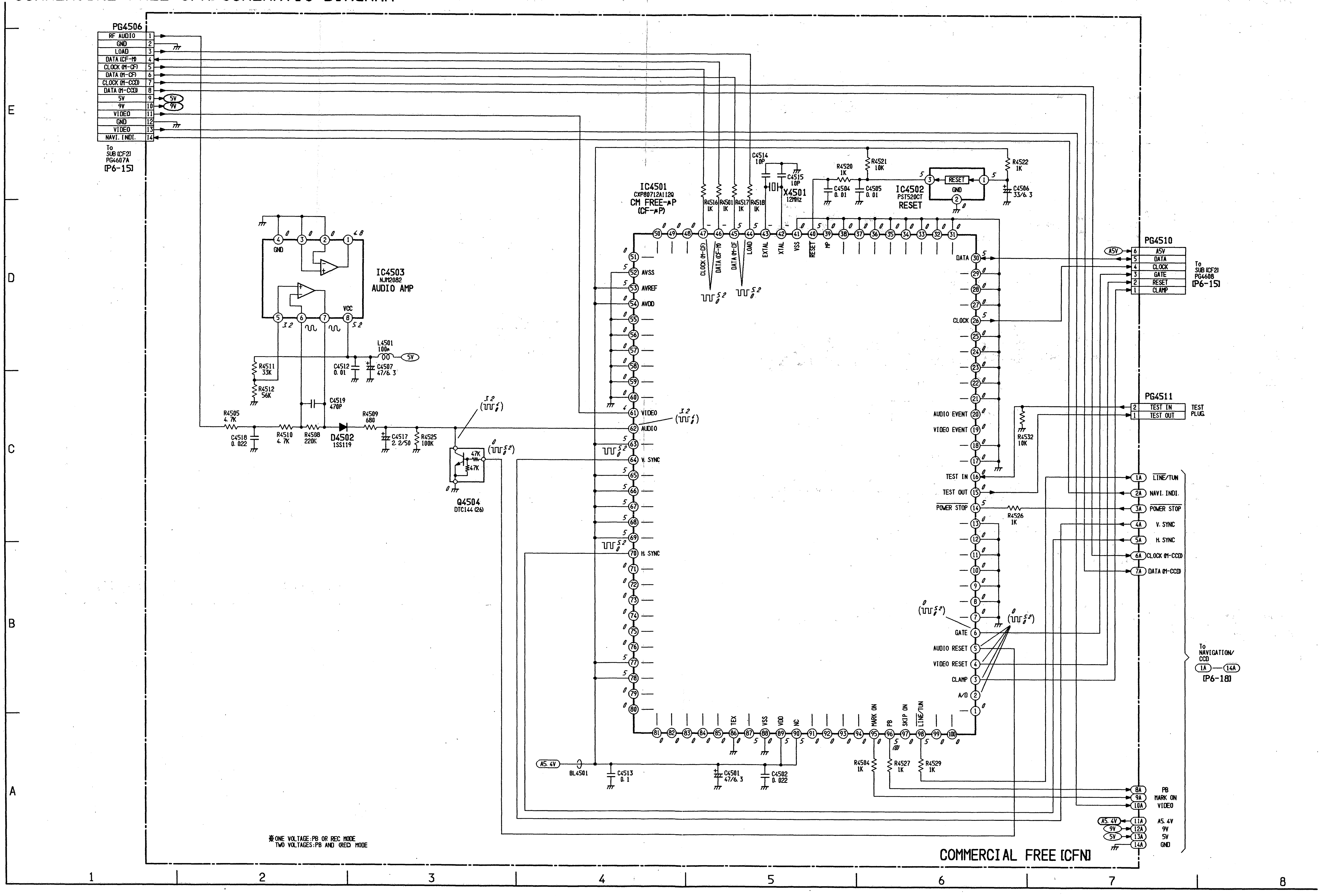
LUMA/CHROMA WAVEFORMS

1-B IC201-4 550mVp-p 0.2V/5.0msec. cm PLAY	5-A IC201-13 530mVp-p 0.2V/20.0 µ sec. cm REC	9-B IC201-50 540mVp-p 0.2V/20.0 µ sec. cm PLAY	13-A IC201-60 1.4Vp-p 0.5V/20.0 µ sec. cm REC
			
2-A IC201-6 380mVp-p 0.2V/5.0msec. cm REC	5-B IC201-13 640mVp-p 0.2V/20.0 µ sec. cm PLAY	10-A IC201-53 5.0Vp-p 2V/20.0 µ sec. cm REC/PLAY	14-A IC201-63 680mVp-p 0.2V/20.0 µ sec. cm REC
			
3-B IC201-7 650mVp-p 0.2V/5.0msec. cm PLAY	6-A IC201-15 400mVp-p 0.1V/20.0 µ sec. cm REC	11-B IC201-55 500mVp-p 0.1V/20.0 µ sec. cm PLAY	14-B IC201-63 680mVp-p 0.2V/20.0 µ sec. cm PLAY
			
4-A IC201-11 330mVp-p 0.1V/20.0 µ sec. cm REC	7-A IC201-16 5.7Vp-p 2V/5.0msec. cm REC/PLAY	12-A IC201-57 2.1Vp-p 0.5V/20.0 µ sec. cm REC	15-A IC201-68 430mVp-p 0.2V/20.0 µ sec. cm REC
			
4-B IC201-11 420mVp-p 0.1V/20.0 µ sec. cm PLAY	8-A IC201-24 510mVp-p 0.2V/100nsec. cm REC/PLAY	12-B IC201-57 2.2Vp-p 0.5V/20.0 µ sec. cm PLAY	15-B IC201-68 430mVp-p 0.2V/20.0 µ sec. cm PLAY
			

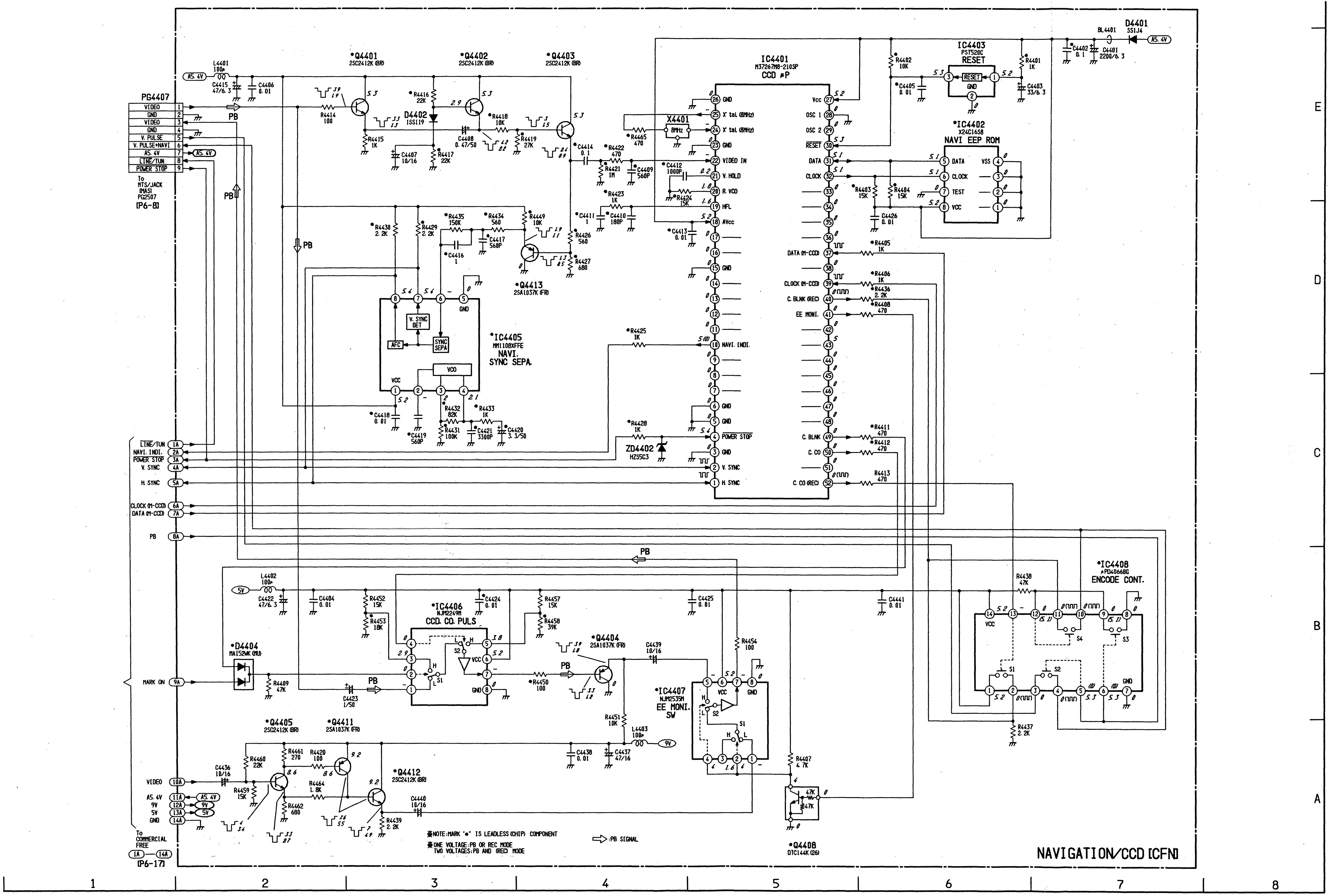
SUB [CF2] SCHEMATIC DIAGRAM


PG4607A
NAVI. (NDI.)
VIDEO
GND
VIDEO
9V
5V
DATA (M-CCD)
CLOCK (M-CCD)
DATA (M-CF)
CLOCK (M-CF)
DATA (CF-M)
LOAD
GND
RF AUDIO
To COMMERCIAL FREE (CFM) PG4506 [P6-16]
PG4607B
To MTS/JACK (MAS) PG2506 [P6-8]
R4632 22K
D4602 1SS254
D4603 1SS254
L4607 100µ
Q4604 2SCA1390C
Q4605 2SC1740S
Q4602 2SC1740S
Q4601 2SCA1390C
R4603 1K
R4605 1K
R4606 1K
R4607 100
R4601 22K
R4698 22K
R4609 1M
C4606 10/16
C4605 0.01
R4604 1K
R4695 1K
L4606 33µ
R4602 10K
C4618 0.047
Q4603 2SC1740S
D4604 1SS254
C4601 33P
C4602 27P
R4608 2.2K
Q4613 2SC1740S
R4671 100
R4626 220K
Q4607 2SC1740S
Q4606 2SCA1390C
L4608 100µ
C4610 10/16
C4611 0.01
C4617 4.7/50
R4627 220K
C4608 150P
R4614 2.2K
R4615 2.2K
C4615 1/50
R4628 2.2K
Q4608 2SCA1390C
R4694 1K
D4606 1SS254
R4629 2.2K
IC4601 NJM2082 AMP
D4601 1SS254
C4604 100P
VCC
GND
PG4608
CLAMP
RESET
GATE
CLOCK
DATA
A5V
To COMMERCIAL FREE (CFM) PG4510 [P6-17]
IC4603 AT24C02 CF-EEPROM
R4612 10K
R4613 10K
C4609 0.01
DATA
CLOCK
VSS
VCC
R4697 1K
D4605 1SS254
C4603 1/50
IC4602 µPD4066 SWITCH
S1
S2
S3
S4
R4611 10K
※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE
SUB [CF2]
E
D
C
B
A
1
2
3
4
5
6
7
8

COMMERCIAL FREE [CFN] SCHEMATIC DIAGRAM


PG4506
RF AUDIO
GND
LOAD
DATA (CF-M)
CLOCK (M-CF)
DATA (M-CF)
CLOCK (M-CCD)
DATA (M-CCD)
5V
9V
VIDEO
GND
VIDEO
NAVI. INDI.
To SUB (CF2) PG4607A [P6-15]
IC4503
NJM2082
AUDIO AMP
GND
VCC
L4501 100μ
R4511 33K
R4512 56K
C4512 0.01
C4507 47/6.3
C4519 470P
R4505 4.7K
C4518 0.022
R4510 4.7K
R4508 220K
D4502 1SS119
R4509 680
C4517 2.2/50
R4525 100K
Q4504 DTC144 (26)
47K
47K
IC4501
CXP80712A112Q
CM FREE-μP
(CF-μP)
C4514 10P
C4515 10P
X4501 12MHz
R4516 1K
R4501 1K
R4517 1K
R4518 1K
R4520 1K
R4521 10K
C4504 0.01
C4505 0.01
IC4502
PST520CT
RESET
GND
R4522 1K
C4506 33/6.3
CLOCK (M-CF)
DATA (CF-M)
DATA (M-CF)
LOAD
EXTAL
XTAL
VSS
RESET
MP
AVSS
AVREF
AVDD
VIDEO
AUDIO
V. SYNC
H. SYNC
DATA
CLOCK
AUDIO EVENT
VIDEO EVENT
TEST IN
TEST OUT
POWER STOP
R4526 1K
GATE
AUDIO RESET
VIDEO RESET
CLAMP
A/D
TEX
VSS
VDD
NC
MARK ON
PB
SKIP ON
LINE/TUN
R4504 1K
R4527 1K
R4529 1K
A5.4V
BL4501
C4513 0.1
C4501 47/6.3
C4502 0.022
PG4510
A5V
DATA
CLOCK
GATE
RESET
CLAMP
To SUB (CF2) PG4608 [P6-15]
PG4511
TEST IN
TEST OUT
TEST PLUG
R4532 10K
LINE/TUN
NAVI. INDI.
POWER STOP
V. SYNC
H. SYNC
CLOCK (M-CCD)
DATA (M-CCD)
PB
MARK ON
VIDEO
A5.4V
9V
5V
GND
To NAVIGATION/ CCD (1A)—(14A) [P6-18]
※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE
COMMERCIAL FREE [CFN]
A
B
C
D
E
1
2
3
4
5
6
7
8

NAVIGATION/CCD [CFN] SCHEMATIC DIAGRAM



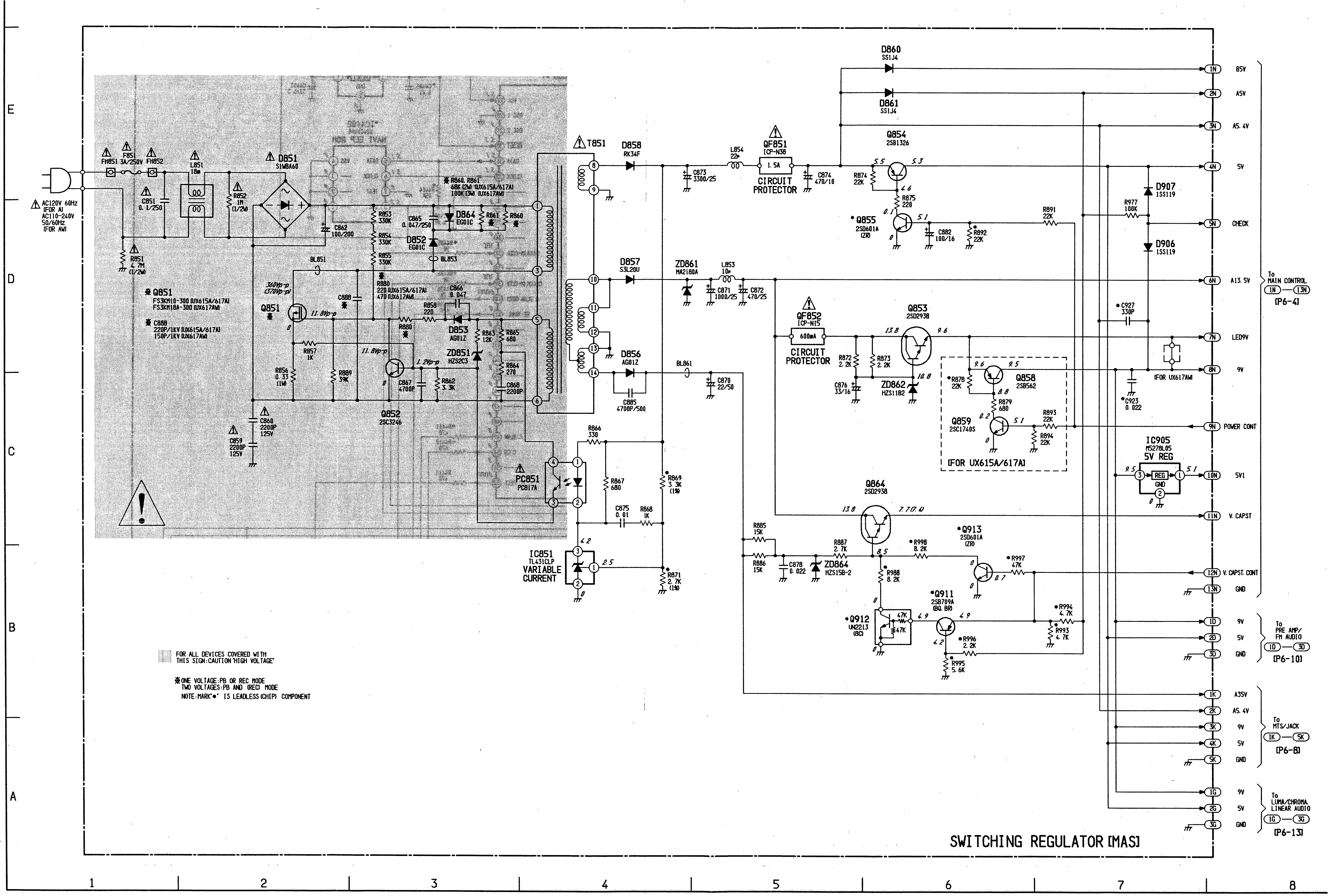
PG4407
VIDEO
GND
VIDEO
GND
V. PULSE
V. PULSE+NAVI
A5. 4V
LINE/TUN
POWER STOP
To MTS/JACK (MAS) PG2507 [P6-8]
L4401 100μ
C4415 47/6.3
C4406 0.01
•Q4401 2SC2412K (BR)
•Q4402 2SC2412K (BR)
•Q4403 2SC2412K (BR)
R4414 100
R4415 1K
•R4416 22K
D4402 1SS119
C4407 10/16
R4417 22K
C4408 0.47/50
•R4418 10K
R4419 27K
•C4414 0.1
•R4422 470
•R4465 470
R4421 1M
•C4409 560P
R4423 1K
•C4411 1
•C4410 180P
•R4430 2.2K
•R4429 2.2K
•R4435 150K
•R4434 560
•C4417 560P
•C4416 1
R4449 10K
•R4426 560
•R4427 680
•Q4413 2SA1037K (FR)
•IC4405 MM1108XFFE NAVI. SYNC SEPA.
V. SYNC DET
AFC
SYNC SEPA
VCO
VCC
GND
•C4418 0.01
•C4419 560P
R4432 82K
R4431 100K
•R4433 1K
•C4421 3300P
C4420 3.3/50
IC4401 M37267M8-210SP CCD μP
X4401 8MHz
•C4412 1000P
•R4424 15K
•C4413 0.01
GND
X' tal (8MHz)
VIDEO IN
V. HOLD
R. VCO
HFL
AVcc
NAVI. INDI.
POWER STOP
V. SYNC
H. SYNC
Vcc
OSC 1
OSC 2
RESET
DATA
CLOCK
DATA (M-CCD)
CLOCK (M-CCD)
C. BLNK (REC)
EE MONI.
C. BLNK
C. CO
C. CO (REC)
•R4425 1K
•R4428 1K
ZD4402 HZS5C3
•R4405 1K
•R4406 1K
•R4436 2.2K
•R4408 470
•R4411 470
•R4412 470
R4413 470
R4402 10K
•C4405 0.01
IC4403 PST520C RESET
R4401 1K
C4403 33/6.3
BL4401
D4401 SS1J4
•C4402 0.1
C4401 2200/6.3
A5.4V
•IC4402 X24C16S8 NAVI EEP ROM
VSS
TEST
VCC
•R4403 15K
•R4404 15K
C4426 0.01
LINE/TUN
NAVI. INDI.
POWER STOP
V. SYNC
H. SYNC
CLOCK (M-CCD)
DATA (M-CCD)
PB
MARK ON
VIDEO
A5.4V
9V
5V
GND
To COMMERCIAL FREE (1A)—(14A) [P6-17]
L4402 100μ
C4422 47/6.3
C4404 0.01
R4452 15K
•R4453 18K
•IC4406 NJM2249M CCD. CO. PULS
•C4424 0.01
R4457 15K
•R4458 39K
•D4404 MA152WK (MD)
R4409 47K
C4423 1/50
•R4450 100
•Q4404 2SA1037K (FR)
C4439 10/16
C4425 0.01
R4454 100
•IC4407 NJM2535M EE MONI. SW
C4441 0.01
R4438 47K
•IC4408 μPD4066BG ENCODE CONT.
R4437 2.2K
R4451 10K
L4403 100μ
C4438 0.01
C4437 47/16
9V
•Q4405 2SC2412K (BR)
•Q4411 2SA1037K (FR)
C4436 10/16
R4460 22K
R4461 270
R4420 100
R4459 15K
R4464 1.8K
R4462 680
•Q4412 2SC2412K (BR)
C4440 10/16
R4439 2.2K
R4407 4.7K
47K
47K
•Q4408 DTC144K (26)
NAVIGATION/CCD [CFN]
1
2
3
4
5
6
7
8
E
D
C
B
A

※NOTE:MARK '●' IS LEADLESS (CHIP) COMPONENT

※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE

⇨:PB SIGNAL

SWITCHING REGULATOR [MAS] SCHEMATIC DIAGRAM


E
D
C
B
A
1
2
3
4
5
6
7
8
AC120V 60Hz [FOR A]
AC110-240V 50/60Hz [FOR AW]
FH851
F851 3A/250V
FH852
C851 0.1/250
L851 18m
R852 1M (1/2W)
R851 4.7M (1/2W)
D851 S1WBA60
C862 100/200
R853 330K
R854 330K
R855 330K
C865 0.047/250
D864 EG01C
D852 EG01C
R861
R860
※R860, R861 68K (2W) [UX615A/617A] 100K (3W) [UX617AW]
BL851
BL853
※Q851 FS3KM10-300 [UX615A/617A] FS3KM18A-300 [UX617AW]
※C888 220P/1KV [UX615A/617A] 150P/1KV [UX617AW]
Q851
C888
360Vp-p (370Vp-p)
11.8Vp-p
R880 220 [UX615A/617A] 470 [UX617AW]
C866 0.047
R858 220
R880
D853 AG01Z
ZD851 HZS2C3
R863 12K
R865 680
R857 1K
R856 0.33 (1W)
R889 39K
C867 4700P
R862 3.3K
R864 270
C868 2200P
1.2Vp-p
Q852 2SC3246
C860 2200P 125V
C859 2200P 125V
PC851 PC817A
T851
D858 RK34F
D857 S3L20U
D856 AG01Z
C885 4700P/500
BL861
C873 3300/25
L854 22μ
QF851 ICP-N38
1.5A
CIRCUIT PROTECTOR
C874 470/10
ZD861 MA2180A
L853 10μ
C871 1000/25
C872 470/25
C870 22/50
R866 330
R867 680
R869 3.3K (1%)
C875 0.01
R868 1K
R871 2.7K (1%)
IC851 TL431CLP VARIABLE CURRENT
4.2
2.5
0
D860 SS1J4
D861 SS1J4
Q854 2SB1326
5.5
5.3
R874 22K
R875 220
4.6
Q855 2SD601A (ZR)
0.1
5.1
C882 100/16
R892 22K
R891 22K
R977 100K
D907 1SS119
D906 1SS119
QF852 ICP-N15
600mA
CIRCUIT PROTECTOR
R872 2.2K
R873 2.2K
C876 33/16
Q853 2SD2938
13.8
9.6
ZD862 HZS11B2
10.8
Q858 2SB562
9.6
9.5
R878 22K
8.8
R879 680
Q859 2SC1740S
0.2
5.1
R893 22K
R894 22K
[FOR UX615A/617A]
C927 330P
C923 0.022
[FOR UX617AW]
IC905 M5278L05 5V REG
9.5
5.1
REG
GND
Q864 2SD2938
13.8
7.7(7.4)
R885 15K
R886 15K
C878 0.022
R887 2.7K
ZD864 HZS15B-2
8.5
R998 8.2K
Q913 2SD601A (ZR)
R997 47K
0.7
R988 8.2K
Q912 UN2213 (BC)
47K
47K
4.9
4.9
Q911 2SB709A (BQ, BR)
4.2
R996 2.2K
R995 5.6K
R994 4.7K
R993 4.7K
1N B5V
2N A5V
3N A5.4V
4N 5V
5N CHECK
6N A13.5V
7N LED9V
8N 9V
9N POWER CONT
10N 5V1
11N V.CAPST
12N V.CAPST.CONT
13N GND
To MAIN CONTROL 1N—13N [P6-4]
1D 9V
2D 5V
3D GND
To PRE AMP/FM AUDIO 1D—3D [P6-10]
1K A35V
2K A5.4V
3K 9V
4K 5V
5K GND
To MTS/JACK 1K—5K [P6-8]
1G 9V
2G 5V
3G GND
To LUMA/CHROMA. LINEAR AUDIO 1G—3G [P6-13]
SWITCHING REGULATOR [MAS]

FOR ALL DEVICES COVERED WITH THIS SIGN:CAUTION'HIGH VOLTAGE'

※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE
NOTE:MARK"•" IS LEADLESS (CHIP) COMPONENT

MEMO

IDENTIFICATION OF PARTS LOCATION

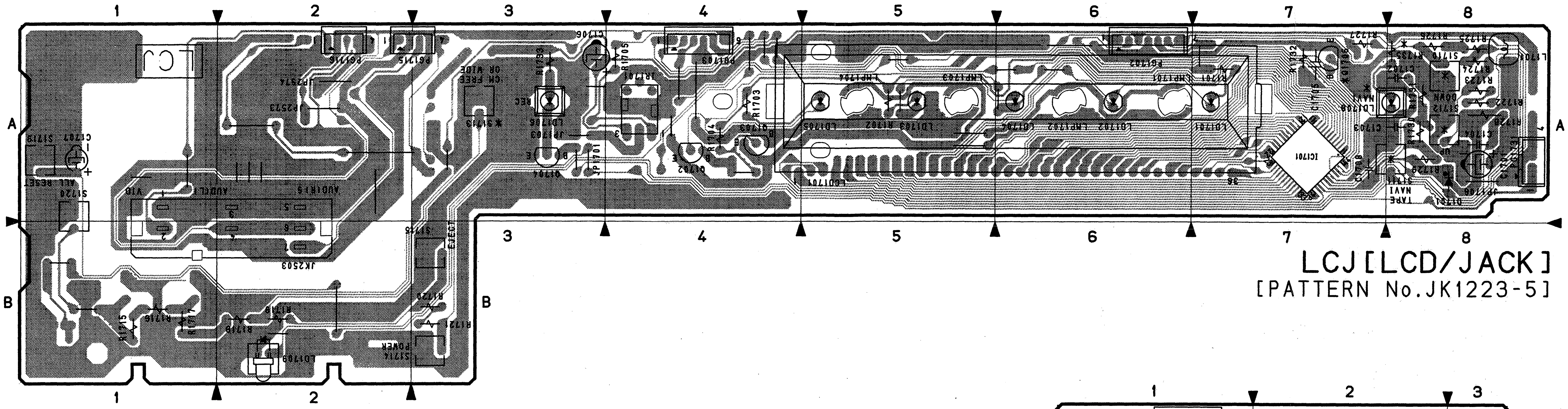
LCJ [LCD/JACK]

Symbol No.	Parts Location
C	
C1701	8A
C1702	8A
C1703	8A
C1704	8A
C1705	7A
C1706	3A
C1707	1A
C1708	7A
D	
D1701	8A
IC	
IC1701	7A
IR	
IR1701	4A
JK	
JK2503	2B
L	
L1701	8A
LCD	
LCD1701	5A
LD	
LD1701	7A
LD1702	6A
LD1703	5A
LD1704	6A
LD1705	5A
LD1706	3A
LD1708	8A
LD1709	2B
LMP	
LMP1701	6A
LMP1702	6A
LMP1703	5A
LMP1704	5A
PG	
PG1702	6A
PG1703	4A
PG1715	2A
PG1716	2A
PG1731	8A
Q	
Q1702	4A
Q1703	4A
Q1704	3A
Q1706	7A
R	
R1701	7A
R1702	5A
R1703	4A
R1704	4A
R1705	4A
R1715	1B
R1716	1B
R1717	1B
R1718	2B
R1719	2B
R1720	3B
R1721	3B
R1722	8A
R1723	8A
R1724	8A
R1725	8A
R1726	8A
R1727	7A
R1728	8A
R1729	8A
R1730	8A
R1731	8A
R1732	7A
R1733	3A
R1735	8A
S	
S1710	8A
S1711	8A
S1712	8A
S1713	3A
S1714	3B
S1715	3B
S1719	1A
S1720	1A

FST [FRONT/SHUTTLE]

Symbol No.	Parts Location
LD	
LD2701	2B
PG	
PG2701	1A
PG2731	1A
R	
R2701	1A
R2702	1A
R2703	1A
R2704	1A
R2706	3A
R2707	3A
R2708	3A
R2709	1B
R2710	1B
R2711	1B
R2712	1B
R2713	1A
R2714	1A
S	
S2701	3B
S2704	2A
S2707	1B
S2708	1A
S2709	1A
S2721	3B

LCJ. FST CIRCUIT BOARDS

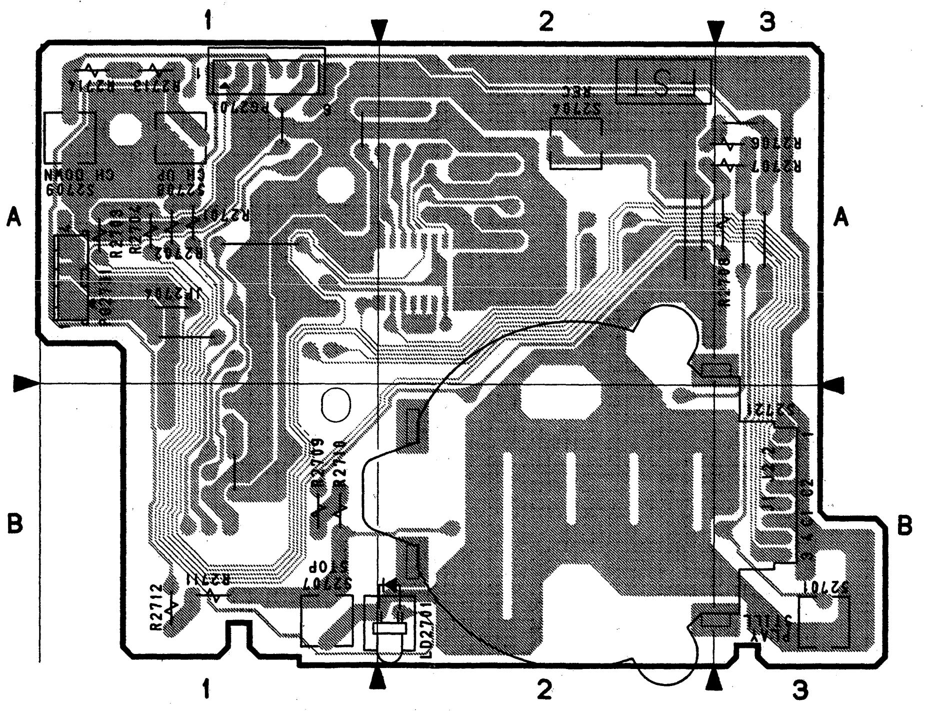

1
2
3
4
5
6
7
8
A
B
IC1701
JK2503

LCJ[LCD/JACK]
[PATTERN No.JK1223-5]

LCJ[LCD/JACK]
DIFFERENCE TABLE

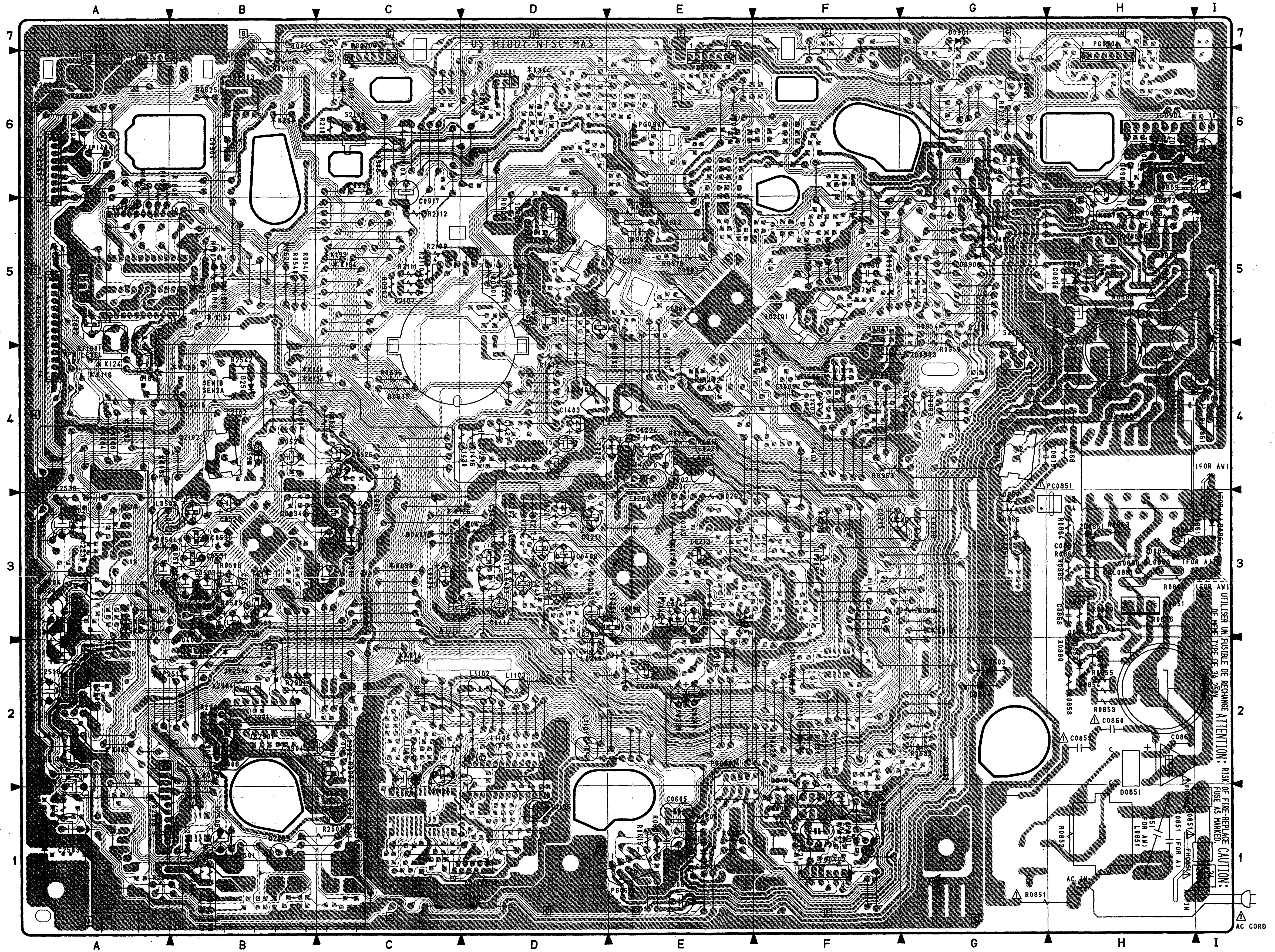
NOTE: This table is listed the different components marked with asterisks (∗) in the circuit board diagrams.

SYMBOL No.	UX615A	UX617A/AW
LD1708	×	○
Q1706	×	○
R1735	×	○
S1710	×	○
S1711	×	○
S1712	×	○
S1713	×	○


1
2
3
A
B
R2712
R2709
R2710

FST[FRONT/SHUTTLE]
[PATTERN No.JK1223-5]

MAS CIRCUIT BOARD [SIDE A]


A
B
C
D
E
F
G
H
I
1
2
3
4
5
6
7
US MIDDY NTSC MAS
AUD
Y/C
(FOR AW)
(FOR A)
AC IN
AC CORD
CAUTION: RISK OF FIRE-REPLACE FUSE AS MARKED.
ATTENTION: UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE DE 3A 250V

MAS[MAIN]-SIDE A-
[PATTERN No.JA1243-8]

MAS[MAIN] – SIDE A – DIFFERENCE TABLE

NOTE: This table is listed the different components marked with asterisks (＊) in the circuit board diagrams.

SYMBOL No.	UX615A	UX617A	UX617AW
C2902	○	×	×
C2904	○	×	×
C2906	○	×	×
C2907	○	×	×
C2908	○	×	×
C4510	×	○	○
IC2901	○	×	×
JP1403	○	×	×
JP1404	○	×	×
JP2513	○	×	×
JP2514	×	○	○
JP2901	○	×	×
K0013	○	×	×
K0024	×	○	○
K0029	○	×	×
K0074	○	×	×
K0082	×	○	○
K0084	×	○	○
K0088	×	○	○
K0093	×	○	○
K0098	×	○	○
K0116	×	○	○
K0123	×	○	○
K0124	×	○	○
K0126	○	×	×
K0134	×	○	○
K0141	×	○	○
K0151	×	○	○
K0169	×	○	○
K0194	×	○	○
K0197	×	○	○
K0199	×	○	○
K0238	○	×	×
K0258	×	○	○
K0295	○	×	×
K0308	×	○	○
K0318	○	×	×
K0344	×	○	○
L2902	○	×	×
L2903	○	×	×
PG2506	×	○	○
PG2507	×	○	○
Q0858	○	○	×
Q0859	○	○	×
R0879	○	○	×
R0893	○	○	×
R0894	○	○	×
R0910A	○	×	×
R2901	○	×	×
R2902	○	×	×
R2905	○	×	×
R2906	○	×	×
R2908	○	×	×
X2901	○	×	×

IDENTIFICATION OF PARTS LOCATION

MAS [MAIN] 1／2

Symbol No.	Parts Location
BL	
BL0851	A-3H
BL0853	A-3H
BL0861	A-4H
BL0901	A-4F
BL0902	A-5E
C	
C0201	B-3F
C0203	B-3E
C0204	B-3F
C0205	B-3F
C0206	B-3E
C0208	B-3D
C0209	B-3E
C0211	A-3D
C0212	B-2F
C0213	A-3E
C0214	B-2F
C0215	A-3F
C0216	B-2F
C0218	A-2E
C0219	B-2F
C0220	B-3F
C0221	A-4E
C0222	B-4E
C0223	A-4E
C0224	A-4E
C0225	A-4E
C0226	A-3D
C0227	A-3D
C0228	B-3D
C0230	B-3D
C0233	A-3D
C0234	A-3E
C0235	B-3D
C0236	B-3E
C0237	B-2E
C0238	A-2E
C0239	A-2E
C0240	A-2E
C0241	B-2E
C0242	A-3E
C0243	B-3E
C0244	A-3E
C0245	A-3E
C0246	B-3E
C0247	B-3E
C0249	B-3E
C0251	B-3E
C0252	B-3E
C0254	B-3E
C0255	B-3E
C0256	B-3E
C0260	B-3E
C0262	B-2C
C0263	B-3E
C0264	B-3F
C0265	B-2F
C0273	B-2D
C0402	A-3D
C0403	B-3D
C0404	B-3D
C0406	B-3D
C0407	A-3D
C0408	A-3D
C0409	B-3D
C0410	B-3D
C0411	A-3D
C0412	A-3D
C0413	A-3D
C0414	A-3D
C0420	A-1F
C0421	A-1F
C0422	A-1F
C0424	B-2F
C0427	B-2F
C0428	B-1F
C0429	A-3D
C0434	A-3C
C0435	B-3D
C0501	A-3A
C0502	A-3B
C0503	A-3B
C0504	A-3B
C0506	A-3B
C0507	B-3B
C0508	A-3B
C0509	A-3B
C0510	B-3B
C0511	B-3B
C0512	B-3C
C0513	A-3C
C0514	B-3B
C0517	B-3B
C0518	B-3C
C0519	A-3C
C0520	A-3C
C0521	B-3C
C0522	B-3B
C0524	A-4B
C0525	A-4C
C0526	A-4C
C0528	A-4B
C0529	A-3B
C0530	A-3B
C0531	A-3B
C0532	A-3B
C0533	B-3B
C0534	A-3C
C0535	B-4B
C0601	A-1E
C0602	A-1E
C0605	A-1E
C0606	B-5E
C0607	B-5D
C0608	A-5E
C0609	A-5D
C0610	A-5D
C0611	B-5D
C0612	A-5D
C0614	A-1E
C0615	A-1E
C0620	A-5D
C0621	A-5D
C0622	B-5E
C0623	A-5D
C0624	A-5D
C0851	A-1H
C0859	A-2H
C0860	A-2H
C0862	A-2H
C0865	A-3H
C0866	A-2H
C0867	A-3H
C0868	A-3H
C0870	A-4H
C0871	A-5H
C0872	A-5H
C0873	A-4H
C0874	A-5H
C0875	A-4G
C0876	A-6I
C0878	A-5H
C0882	A-6H
C0885	A-4H
C0888	A-3H
C0901	B-5E
C0902	B-6B
C0904	A-6B
C0907	B-5F
C0908	B-5F
C0909	B-4F
C0910	B-4F
C0912	B-6H
C0913	B-6H
C0914	A-6I
C0915	B-6H
C0916	B-6I
C0917	A-6C
C0918	B-5F
C0919	B-5E
C0920	B-5E
C0922	B-6I
C0923	B-6D
C0924	B-5E
C0925	B-5E
C0926	B-5E
C0927	B-6F
C0928	B-6G
C0940	B-5F
C0942	A-5E
C0972	B-4D
C0980	A-5F
C0981	B-4G
C0982	B-6D
C0983	A-5E
C0984	A-5E
C0985	B-6D
C1102	B-2D
C1103	B-2D
C1104	B-2D
C1105	B-2D
C1106	A-1D
C1107	B-1D
C1108	B-1D
C1110	B-1D
C1111	B-1D
C1112	B-1D
C1114	B-1C
C1115	B-1C
C1116	B-1C
C1117	B-1C
C1118	B-1C
C1119	B-1C
C1120	B-1C
C1121	B-1C
C1122	B-1C
C1123	B-1D
C1124	B-2D
C1125	A-2C
C1126	B-2C
C1127	B-2C
C1128	A-2C
C1129	B-2C
C1131	B-2C
C1134	B-2D
C1135	B-1D
C1136	B-1D
C1137	B-2C
C1138	B-2D
C1140	B-2C
C1141	B-2D
C1401	A-4F
C1402	B-4F
C1403	A-4D
C1404	B-4E
C1405	A-4F
C1409	B-4E
C1410	B-4E
C1411	B-4E
C1414	A-4D
C1415	A-4D
C1416	A-2A
C1417	B-2A
C1419	B-1A
C1424	A-4D
C1425	B-2F
C1426	B-4F
C1427	A-4D
C1428	B-4F
C1802	A-5A
C1811	A-4A
C2102	A-4B
C2501	A-1C
C2502	B-1B
C2503	A-1A
C2504	A-1B
C2505	A-1B
C2506	A-1B
C2507	A-2A
C2508	A-1B
C2509	A-1A
C2513	A-2A
C2514	B-2A
C2517	B-2A
C2518	A-2A
C2519	B-3A
C2520	A-3A
C2524	B-3A
C2525	A-3A
C2531	A-3A
C2532	A-3A
C2539	A-1A
C2901	B-2B
C2902	A-2C
C2903	B-2B
C2904	A-2C
C2905	B-2B
C2906	A-1C
C2907	A-2B
C2908	A-2B
C2909	B-2B
C2910	B-2B
D	
D0603	A-2G
D0604	A-2G
D0851	A-2H
D0852	A-3H
D0853	A-2H
D0856	A-4H
D0857	A-4H
D0858	A-4H
D0860	A-5G
D0861	A-5G
D0864	A-3I
D0901	A-7G
D0906	A-5G
D0907	A-5G
D0908	A-6H
D0909	A-6H
D1101	A-2F
D1102	B-2C
D1403	A-2F
D2501	A-1D
D2502	A-1A
D2504	A-4B
F	
F0851	A-1I
FE	
FE2501	A-1A
FH	
FH0851	A-1I
FH0852	A-1I
IC	
IC0201	B-3E
IC0202	B-2F
IC0501	B-3B
IC0851	A-3G
IC0901	B-5E
IC0902	A-6G
IC0903	A-6B
IC0904	A-6H
IC0965	A-5D
IC1101	B-1C
IC1102	A-2D
IC1801	A-5A
IC2101	A-5F
IC2102	A-5D
IC2501	B-1B
IC2901	A-2B
JK	
JK2501	A-1B
JP	
JP0602	B-5D
JP0852	B-5H
JP1403	A-6A
JP1404	A-6A
JP2513	A-2A
JP2514	A-2B
JP2901	A-2B
K	
K0013	A-2A
K0024	A-2B
K0029	A-2A
K0074	A-2C
K0082	A-4A
K0084	A-4A
K0088	A-4A
K0093	A-4A
K0098	A-3C
K0116	A-4A
K0123	A-4B
K0124	A-4A
K0126	A-3C
K0134	A-4B
K0144	A-4B
K0151	A-5B
K0169	A-5A
K0197	A-6A
K0238	A-6C
K0258	A-6B
K0295	A-3F
K0308	A-6C
K0318	A-3G
K0344	A-6D
K0442	A-4B
L	
L0202	A-4E
L0203	A-3E
L0204	A-4E
L0205	A-4E
L0206	A-3E
L0208	A-3G
L0209	A-3F
L0210	A-2D
L0401	A-3D
L0403	A-1F
L0501	A-3C
L0502	A-3A
L0851	A-1H
L0853	A-5H
L0854	A-4H
L1101	A-2D
L1102	A-2D
L1103	A-2D
L1105	A-2D
L1106	A-2C
L1402	A-4E
L1403	A-4F
L1406	A-3A
L1801	A-5A
L2502	A-2A
L2504	A-3A
L2902	A-2C
L2903	A-1C
LD	
LD2101	A-4D
PC	
PC0851	A-3H
PG	
PG0401	A-2B
PG0402	A-1F
PG0601	A-2E
PG0602	A-1E
PG0701	A-6H
PG0702	A-6E
PG0703	A-6C
PG0901	A-6E
PG1101	A-1D
PG2506	A-5A
PG2507	A-6A
PG2508	A-1A
PG2509	A-5A
PG2515	A-6A
PG2516	A-6A
Q	
Q0226	B-3D
Q0228	B-3E
Q0406	A-2F
Q0409	A-1F
Q0410	B-2F
Q0411	A-1F
Q0412	B-1F
Q0413	B-1F
Q0601	B-5D
Q0701	B-6H
Q0702	B-7H
Q0851	A-3H
Q0852	A-3H
Q0853	A-5H
Q0854	A-5H
Q0855	B-6G
Q0858	A-5H
Q0859	A-6H
Q0864	A-5H
Q0901	A-6D
Q0902	B-6D
Q0905	B-6D
Q0906	B-6D
Q0911	B-5F
Q0912	B-5F
Q0913	B-5F
Q0914	B-6H
Q1101	B-2C
Q1102	B-2C
Q1401	B-4F
Q1404	B-4D
Q1407	B-1A
Q1409	B-4D
Q1410	B-4D
Q1411	B-4F
Q1802	B-5B
Q2101	A-4G
Q2102	A-4B
Q2103	B-5F
Q2104	B-5D
Q2501	B-1C
Q2502	B-1B
Q2503	B-1B
Q2504	B-3A
Q2505	B-3A
Q2506	B-1A
Q2509	A-1B
Q2901	B-2C
QF	
QF0851	A-5H
QF0852	A-5H
R	
R0205	B-2C
R0206	B-3F
R0207	B-2C
R0208	B-2C
R0212	A-3E
R0213	A-3E
R0215	A-4D
R0216	A-4E
R0217	A-3D
R0218	A-4E
R0227	B-3D
R0228	B-2E
R0229	B-2E
R0238	B-3E
R0240	B-3E
R0241	B-3E
R0253	B-3F
R0254	A-3E
R0257	B-2F
R0258	A-2D
R0263	A-3E
R0265	B-3D
R0402	A-3D
R0403	B-3D
R0404	B-3D
R0407	B-3D
R0408	B-3D
R0409	B-3D
R0410	B-3D
R0420	B-1F
R0421	B-2F
R0422	B-1F
R0423	A-2F
R0424	B-3D
R0425	B-3D
R0426	A-3D
R0427	A-3C
R0429	B-1F
R0430	B-1F
R0431	B-1F
R0432	B-1F
R0434	B-1F
R0435	B-3D
R0436	B-3D
R0437	B-3D
R0501	A-3A
R0502	A-3B
R0503	A-3A
R0504	A-3B
R0505	A-3A
R0506	A-3B
R0509	A-3B
R0510	B-3B
R0511	B-3B
R0512	B-3B
R0516	B-3B
R0517	B-3B
R0520	A-4B
R0521	B-3C
R0522	B-4C
R0523	B-4C
R0524	A-4C
R0525	B-4C
R0526	B-3B
R0527	B-3B
R0530	B-4B
R0531	B-4B
R0532	B-3B
R0533	B-3B
R0534	B-3B
R0540	A-5B
R0541	A-5B
R0602	A-1E
R0605	A-1E
R0615	A-1E
R0621	A-5B
R0622	A-5D
R0623	B-5E
R0624	B-5E
R0625	A-6B
R0626	A-4E
R0627	A-5D
R0628	B-6D
R0629	B-5E
R0630	B-5E
R0631	B-5D
R0632	B-5D
R0633	B-5D
R0634	B-5D
R0635	A-4C
R0636	A-4C
R0637	A-2G
R0638	A-2B
R0639	B-4D
R0710	B-7H
R0711	A-6G
R0712	B-6H
R0713	B-6H
R0714	B-6H
R0851	A-1G
R0852	A-1H
R0853	A-2H
R0854	A-2H
R0855	A-2H
R0856	A-3H
R0857	A-3H
R0858	A-2H
R0860	A-3H
R0861	A-3I
R0862	A-3H
R0863	A-3H
R0864	A-3H
R0865	A-3H
R0866	A-3G
R0867	A-3G
R0868	A-4H
R0869	B-3G
R0871	B-3G
R0872	A-5H
R0873	A-5H
R0874	A-5G
R0875	A-6G
R0878	B-5H
R0879	A-5H
R0880	A-2H
R0885	A-5H
R0886	A-5H
R0887	A-5H
R0889	A-3H
R0891	A-6G
R0892	B-5H
R0893	A-6G
R0894	A-6H
R0901	A-5D
R0902	A-5C
R0903	B-6D
R0904	B-6C
R0905	A-6C
R0906	B-6E
R0907	B-6D
R0908	B-6D
R0909	B-6D
R0910A	A-6C
R0911	B-6D
R0913	B-6D
R0914	B-6E
R0915	B-6E
R0916	B-6E
R0917	B-6E
R0918	B-6C
R0919	A-6B
R0920	A-6E
R0921	B-6E
R0922	B-6E
R0923	A-6D
R0924	B-5E
R0925	B-5E
R0926	B-5E
R0927	B-5F
R0928	B-6F
R0929	B-6F
R0934	B-6F
R0935	B-6G
R0936	B-6D
R0937	B-6D
R0938	B-5E
R0939	B-5F
R0940	B-5F
R0941	A-6B
R0943	A-5F
R0944	A-5F
R0945	A-5F
R0946	B-4G
R0947	A-5F
R0948	B-6G
R0950	A-5G
R0951	B-5F
R0952	B-5G
R0954	A-5G
R0955	B-5G
R0956	A-3G
R0957	B-5F
R0963	A-4F
R0967	A-1E
R0969	B-4F
R0970	B-4F
R0971	B-4F
R0972	B-4D
R0976	A-6H
R0977	A-5G
R0978	A-5E
R0979	B-6D
R0980	B-6D
R0981	B-6D
R0983	B-6E
R0984	B-6E
R0988	B-5F
R0990	A-4F
R0991	B-6F
R0992	B-6F
R0993	B-5F
R0994	B-5F
R0995	B-5F
R0996	B-5F
R0997	B-5F
R0998	B-5F
R0999	A-5E
R1101	B-2D
R1103	B-2D
R1104	B-1D
R1107	B-1C
R1108	B-1C
R1109	B-2C
R1110	B-2C
R1112	B-2C
R1113	B-2C
R1115	B-2C
R1116	B-2C
R1117	A-2C
R1118	B-2C
R1120	B-2D
R1121	A-2F
R1403	A-4G
R1405	B-4F
R1406	A-4F
R1407	B-4F
R1409	B-4E
R1410	B-4D
R1412	A-4D
R1413	B-2F
R1416	A-4D
R1418	A-4D
R1421	A-1A
R1422	B-2A
R1423	B-2A
R1424	B-2A
R1430	A-4D
R1432	B-4F
R1433	B-4F
R1434	B-4E
R1437	B-4F
R1438	B-4F
R1802	B-5A
R1806	A-6A
R1807	A-5B
R1808	A-6A
R1809	A-6A
R1818	A-5B
R1820	A-5B
R1822	A-5B
R2101	A-5G
R2102	A-6C
R2103	B-5D
R2104	B-5F
R2105	B-5F
R2106	B-4D
R2107	A-5C
R2108	A-5C
R2109	A-5C
R2110	A-5C
R2111	A-5C
R2112	A-5C
R2113	B-4D
R2114	B-5D
R2115	B-5D
R2116	A-5F
R2117	B-5F
R2501	A-1C
R2502	B-1B
R2503	A-1A
R2504	A-1B
R2507	B-1C
R2508	B-1C
R2509	B-1B
R2510	B-1B
R2511	B-1B
R2512	B-1A
R2514	A-2A
R2516	B-3A
R2517	B-3A
R2518	B-3A
R2523	B-3A
R2524	B-3A
R2527	A-1B
R2530	A-6A
R2533	B-3A
R2534	B-3A
R2535	B-3A
R2536	A-1B
R2537	A-6A
R2538	A-3A
R2539	B-3A
R2540	B-2A
R2541	B-3A
R2542	A-4B
R2901	A-2B
R2902	A-2C
R2903	B-2C
R2904	B-2B
R2905	A-2B
R2906	A-2B
R2907	B-2B
R2908	A-2B
R2909	B-2B
RT	
RT1801	A-5A
S	
S2101	A-5D
S2102	A-4G
S2103	A-6C
T	
T0401	A-1F
T0851	A-4H
X	
X0201	A-4E
X0901	A-5F
X0902	A-4F
X2901	A-2B
ZB	
ZB0071	B-5D
ZB0072	B-5D
ZD	
ZD0851	A-3H
ZD0861	A-4H
ZD0862	A-5I
ZD0864	A-5H
ZD0901	A-6H
ZD0903	A-4F
ZD0904	A-6H
ZD2501	A-2A
ZD2502	A-3A

IDENTIFICATION OF PARTS LOCATION

MAS [MAIN] 1/2

Symbol No.	Parts Location
BL	
BL0851	A-3H
BL0853	A-3H
BL0861	A-4H
BL0901	A-4F
BL0902	A-5E
C	
C0201	B-3F
C0203	B-3E
C0204	B-3F
C0205	B-3F
C0206	B-3E
C0208	B-3D
C0209	B-3E
C0211	A-3D
C0212	B-2F
C0213	A-3E
C0214	B-2F
C0215	A-3F
C0216	B-2F
C0218	A-2E
C0219	B-2F
C0220	B-3F
C0221	A-4E
C0222	B-4E
C0223	A-4E
C0224	A-4E
C0225	A-4E
C0226	A-3D
C0227	A-3D
C0228	B-3D
C0230	B-3D
C0233	A-3D
C0234	A-3E
C0235	B-3D
C0236	B-3E
C0237	B-2E
C0238	A-2E
C0239	A-2E
C0240	A-2E
C0241	B-2E
C0242	A-3E
C0243	B-3E
C0244	A-3E
C0245	A-3E
C0246	B-3E
C0247	B-3E
C0249	B-3E
C0251	B-3E
C0252	B-3E
C0254	B-3E
C0255	B-3E
C0256	B-3E
C0260	B-3E
C0262	B-2C
C0263	B-3E
C0264	B-3F

Symbol No.	Parts Location
C0265	B-2F
C0273	B-2D
C0402	A-3D
C0403	B-3D
C0404	B-3D
C0406	B-3D
C0407	A-3D
C0408	A-3D
C0409	B-3D
C0410	B-3D
C0411	A-3D
C0412	A-3D
C0413	A-3D
C0414	A-3D
C0420	A-1F
C0421	A-1F
C0422	A-1F
C0424	B-2F
C0427	B-2F
C0428	B-1F
C0429	A-3D
C0434	A-3C
C0435	B-3D
C0501	A-3A
C0502	A-3B
C0503	A-3B
C0504	A-3B
C0506	A-3B
C0507	B-3B
C0508	A-3B
C0509	A-3B
C0510	B-3B
C0511	B-3B
C0512	B-3C
C0513	A-3C
C0514	B-3B
C0517	B-3B
C0518	B-3C
C0519	A-3C
C0520	A-3C
C0521	B-3C
C0522	B-3B
C0524	A-4B
C0525	A-4C
C0526	A-4C
C0528	A-4B
C0529	A-3B
C0530	A-3B
C0531	A-3B
C0532	A-3B
C0533	B-3B
C0534	A-3C
C0535	B-4B
C0601	A-1E
C0602	A-1E
C0605	A-1E
C0606	B-5E

Symbol No.	Parts Location
C0607	B-5D
C0608	A-5E
C0609	A-5D
C0610	A-5D
C0611	B-5D
C0612	A-5D
C0614	A-1E
C0615	A-1E
C0620	A-5D
C0621	A-5D
C0622	B-5E
C0623	A-5D
C0624	A-5D
C0851	A-1H
C0859	A-2H
C0860	A-2H
C0862	A-2H
C0865	A-3H
C0866	A-2H
C0867	A-3H
C0868	A-3H
C0870	A-4H
C0871	A-5H
C0872	A-5H
C0873	A-4H
C0874	A-5H
C0875	A-4G
C0876	A-6I
C0878	A-5H
C0882	A-6H
C0885	A-4H
C0888	A-3H
C0901	B-5E
C0902	B-6B
C0904	A-6B
C0907	B-5F
C0908	B-5F
C0909	B-4F
C0910	B-4F
C0912	B-6H
C0913	B-6H
C0914	A-6I
C0915	B-6H
C0916	B-6I
C0917	A-6C
C0918	B-5F
C0919	B-5E
C0920	B-5E
C0922	B-6I
C0923	B-6D
C0924	B-5E
C0925	B-5E
C0926	B-5E
C0927	B-6F
C0928	B-6G
C0940	B-5F
C0942	A-5E

Symbol No.	Parts Location
C0972	B-4D
C0980	A-5F
C0981	B-4G
C0982	B-6D
C0983	A-5E
C0984	A-5E
C0985	B-6D
C1102	B-2D
C1103	B-2D
C1104	B-2D
C1105	B-2D
C1106	A-1D
C1107	B-1D
C1108	B-1D
C1110	B-1D
C1111	B-1D
C1112	B-1D
C1114	B-1C
C1115	B-1C
C1116	B-1C
C1117	B-1C
C1118	B-1C
C1119	B-1C
C1120	B-1C
C1121	B-1C
C1122	B-1C
C1123	B-1D
C1124	B-2D
C1125	A-2C
C1126	B-2C
C1127	B-2C
C1128	A-2C
C1129	B-2C
C1131	B-2C
C1134	B-2D
C1135	B-1D
C1136	B-1D
C1137	B-2C
C1138	B-2D
C1140	B-2C
C1141	B-2D
C1401	A-4F
C1402	B-4F
C1403	A-4D
C1404	B-4E
C1405	A-4F
C1409	B-4E
C1410	B-4E
C1411	B-4E
C1414	A-4D
C1415	A-4D
C1416	A-2A
C1417	B-2A
C1419	B-1A
C1424	A-4D
C1425	B-2F
C1426	B-4F

Symbol No.	Parts Location
C1427	A-4D
C1428	B-4F
C1802	A-5A
C1811	A-4A
C2102	A-4B
C2501	A-1C
C2502	B-1B
C2503	A-1A
C2504	A-1B
C2505	A-1B
C2506	A-1B
C2507	A-2A
C2508	A-1B
C2509	A-1A
C2513	A-2A
C2514	B-2A
C2517	B-2A
C2518	A-2A
C2519	B-3A
C2520	A-3A
C2524	B-3A
C2525	A-3A
C2531	A-3A
C2532	A-3A
C2539	A-1A
C2901	B-2B
C2902	A-2C
C2903	B-2B
C2904	A-2C
C2905	B-2B
C2906	A-1C
C2907	A-2B
C2908	A-2B
C2909	B-2B
C2910	B-2B
D	
D0603	A-2G
D0604	A-2G
D0851	A-2H
D0852	A-3H
D0853	A-2H
D0856	A-4H
D0857	A-4H
D0858	A-4H
D0860	A-5G
D0861	A-5G
D0864	A-3I
D0901	A-7G
D0906	A-5G
D0907	A-5G
D0908	A-6H
D0909	A-6H
D1101	A-2F
D1102	B-2C
D1403	A-2F
D2501	A-1D
D2502	A-1A

Symbol No.	Parts Location
D2504	A-4B
F	
F0851	A-1I
FE	
FE2501	A-1A
FH	
FH0851	A-1I
FH0852	A-1I
IC	
IC0201	B-3E
IC0202	B-2F
IC0501	B-3B
IC0851	A-3G
IC0901	B-5E
IC0902	A-6G
IC0903	A-6B
IC0904	A-6H
IC0965	A-5D
IC1101	B-1C
IC1102	A-2D
IC1801	A-5A
IC2101	A-5F
IC2102	A-5D
IC2501	B-1B
IC2901	A-2B
JK	
JK2501	A-1B
JP	
JP0602	B-5D
JP0852	B-5H
JP1403	A-6A
JP1404	A-6A
JP2513	A-2A
JP2514	A-2B
JP2901	A-2B
K	
K0013	A-2A
K0024	A-2B
K0029	A-2A
K0074	A-2C
K0082	A-4A
K0084	A-4A
K0088	A-4A
K0093	A-4A
K0098	A-3C
K0116	A-4A
K0123	A-4B
K0124	A-4A
K0126	A-3C
K0134	A-4B
K0144	A-4B
K0151	A-5B
K0169	A-5A
K0197	A-6A
K0238	A-6C
K0258	A-6B
K0295	A-3F

Symbol No.	Parts Location
K0308	A-6C
K0318	A-3G
K0344	A-6D
K0442	A-4B
L	
L0202	A-4E
L0203	A-3E
L0204	A-4E
L0205	A-4E
L0206	A-3E
L0208	A-3G
L0209	A-3F
L0210	A-2D
L0401	A-3D
L0403	A-1F
L0501	A-3C
L0502	A-3A
L0851	A-1H
L0853	A-5H
L0854	A-4H
L1101	A-2D
L1102	A-2D
L1103	A-2D
L1105	A-2D
L1106	A-2C
L1402	A-4E
L1403	A-4F
L1406	A-3A
L1801	A-5A
L2502	A-2A
L2504	A-3A
L2902	A-2C
L2903	A-1C
LD	
LD2101	A-4D
PC	
PC0851	A-3H
PG	
PG0401	A-2B
PG0402	A-1F
PG0601	A-2E
PG0602	A-1E
PG0701	A-6H
PG0702	A-6E
PG0703	A-6C
PG0901	A-6E
PG1101	A-1D
PG2506	A-5A
PG2507	A-6A
PG2508	A-1A
PG2509	A-5A
PG2515	A-6A
PG2516	A-6A
Q	
Q0226	B-3D
Q0228	B-3E
Q0406	A-2F

Symbol No.	Parts Location
Q0409	A-1F
Q0410	B-2F
Q0411	A-1F
Q0412	B-1F
Q0413	B-1F
Q0601	B-5D
Q0701	B-6H
Q0702	B-7H
Q0851	A-3H
Q0852	A-3H
Q0853	A-5H
Q0854	A-5H
Q0855	B-6G
Q0858	A-5H
Q0859	A-6H
Q0864	A-5H
Q0901	A-6D
Q0902	B-6D
Q0905	B-6D
Q0906	B-6D
Q0911	B-5F
Q0912	B-5F
Q0913	B-5F
Q0914	B-6H
Q1101	B-2C
Q1102	B-2C
Q1401	B-4F
Q1404	B-4D
Q1407	B-1A
Q1409	B-4D
Q1410	B-4D
Q1411	B-4F
Q1802	B-5B
Q2101	A-4G
Q2102	A-4B
Q2103	B-5F
Q2104	B-5D
Q2501	B-1C
Q2502	B-1B
Q2503	B-1B
Q2504	B-3A
Q2505	B-3A
Q2506	B-1A
Q2509	A-1B
Q2901	B-2C
QF	
QF0851	A-5H
QF0852	A-5H
R	
R0205	B-2C
R0206	B-3F
R0207	B-2C
R0208	B-2C
R0212	A-3E
R0213	A-3E
R0215	A-4D
R0216	A-4E

Symbol No.	Parts Location
R0217	A-3D
R0218	A-4E
R0227	B-3D
R0228	B-2E
R0229	B-2E
R0238	B-3E
R0240	B-3E
R0241	B-3E
R0253	B-3F
R0254	A-3E
R0257	B-2F
R0258	A-2D
R0263	A-3E
R0265	B-3D
R0402	A-3D
R0403	B-3D
R0404	B-3D
R0407	B-3D
R0408	B-3D
R0409	B-3D
R0410	B-3D
R0420	B-1F
R0421	B-2F
R0422	B-1F
R0423	A-2F
R0424	B-3D
R0425	B-3D
R0426	A-3D
R0427	A-3C
R0429	B-1F
R0430	B-1F
R0431	B-1F
R0432	B-1F
R0434	B-1F
R0435	B-3D
R0436	B-3D
R0437	B-3D
R0501	A-3A
R0502	A-3B
R0503	A-3A
R0504	A-3B
R0505	A-3A
R0506	A-3B
R0509	A-3B
R0510	B-3B
R0511	B-3B
R0512	B-3B
R0516	B-3B
R0517	B-3B
R0520	A-4B
R0521	B-3C
R0522	B-4C
R0523	B-4C
R0524	A-4C
R0525	B-4C
R0526	B-3B
R0527	B-3B

Symbol No.	Parts Location
R0530	B-4B
R0531	B-4B
R0532	B-3B
R0533	B-3B
R0534	B-3B
R0540	A-5B
R0541	A-5B
R0602	A-1E
R0605	A-1E
R0615	A-1E
R0621	A-5B
R0622	A-5D
R0623	B-5E
R0624	B-5E
R0625	A-6B
R0626	A-4E
R0627	A-5D
R0628	B-6D
R0629	B-5E
R0630	B-5E
R0631	B-5D
R0632	B-5D
R0633	B-5D
R0634	B-5D
R0635	A-4C
R0636	A-4C
R0637	A-2G
R0638	A-2B
R0639	B-4D
R0710	B-7H
R0711	A-6G
R0712	B-6H
R0713	B-6H
R0714	B-6H
R0851	A-1G
R0852	A-1H
R0853	A-2H
R0854	A-2H
R0855	A-2H
R0856	A-3H
R0857	A-3H
R0858	A-2H
R0860	A-3H
R0861	A-3I
R0862	A-3H
R0863	A-3H
R0864	A-3H
R0865	A-3H
R0866	A-3G
R0867	A-3G
R0868	A-4H
R0869	B-3G
R0871	B-3G
R0872	A-5H
R0873	A-5H
R0874	A-5G
R0875	A-6G

Symbol No.	Parts Location
R0878	B-5H
R0879	A-5H
R0880	A-2H
R0885	A-5H
R0886	A-5H
R0887	A-5H
R0889	A-3H
R0891	A-6G
R0892	B-5H
R0893	A-6G
R0894	A-6H
R0901	A-5D
R0902	A-5C
R0903	B-6D
R0904	B-6C
R0905	A-6C
R0906	B-6E
R0907	B-6D
R0908	B-6D
R0909	B-6D
R0910A	A-6C
R0911	B-6D
R0913	B-6D
R0914	B-6E
R0915	B-6E
R0916	B-6E
R0917	B-6E
R0918	B-6C
R0919	A-6B
R0920	A-6E
R0921	B-6E
R0922	B-6E
R0923	A-6D
R0924	B-5E
R0925	B-5E
R0926	B-5E
R0927	B-5F
R0928	B-6F
R0929	B-6F
R0934	B-6F
R0935	B-6G
R0936	B-6D
R0937	B-6D
R0938	B-5E
R0939	B-5F
R0940	B-5F
R0941	A-6B
R0943	A-5F
R0944	A-5F
R0945	A-5F
R0946	B-4G
R0947	A-5F
R0948	B-6G
R0950	A-5G
R0951	B-5F
R0952	B-5G
R0954	A-5G

Symbol No.	Parts Location
R0955	B-5G
R0956	A-3G
R0957	B-5F
R0963	A-4F
R0967	A-1E
R0969	B-4F
R0970	B-4F
R0971	B-4F
R0972	B-4D
R0976	A-6H
R0977	A-5G
R0978	A-5E
R0979	B-6D
R0980	B-6D
R0981	B-6D
R0983	B-6E
R0984	B-6E
R0988	B-5F
R0990	A-4F
R0991	B-6F
R0992	B-6F
R0993	B-5F
R0994	B-5F
R0995	B-5F
R0996	B-5F
R0997	B-5F
R0998	B-5F
R0999	A-5E
R1101	B-2D
R1103	B-2D
R1104	B-1D
R1107	B-1C
R1108	B-1C
R1109	B-2C
R1110	B-2C
R1112	B-2C
R1113	B-2C
R1115	B-2C
R1116	B-2C
R1117	A-2C
R1118	B-2C
R1120	B-2D
R1121	A-2F
R1403	A-4G
R1405	B-4F
R1406	A-4F
R1407	B-4F
R1409	B-4E
R1410	B-4D
R1412	A-4D
R1413	B-2F
R1416	A-4D
R1418	A-4D
R1421	A-1A
R1422	B-2A
R1423	B-2A
R1424	B-2A

Symbol No.	Parts Location
R1430	A-4D
R1432	B-4F
R1433	B-4F
R1434	B-4E
R1437	B-4F
R1438	B-4F
R1802	B-5A
R1806	A-6A
R1807	A-5B
R1808	A-6A
R1809	A-6A
R1818	A-5B
R1820	A-5B
R1822	A-5B
R2101	A-5G
R2102	A-6C
R2103	B-5D
R2104	B-5F
R2105	B-5F
R2106	B-4D
R2107	A-5C
R2108	A-5C
R2109	A-5C
R2110	A-5C
R2111	A-5C
R2112	A-5C
R2113	B-4D
R2114	B-5D
R2115	B-5D
R2116	A-5F
R2117	B-5F
R2501	A-1C
R2502	B-1B
R2503	A-1A
R2504	A-1B
R2507	B-1C
R2508	B-1C
R2509	B-1B
R2510	B-1B
R2511	B-1B
R2512	B-1A
R2514	A-2A
R2516	B-3A
R2517	B-3A
R2518	B-3A
R2523	B-3A
R2524	B-3A
R2527	A-1B
R2530	A-6A
R2533	B-3A
R2534	B-3A
R2535	B-3A
R2536	A-1B
R2537	A-6A
R2538	A-3A
R2539	B-3A
R2540	B-2A

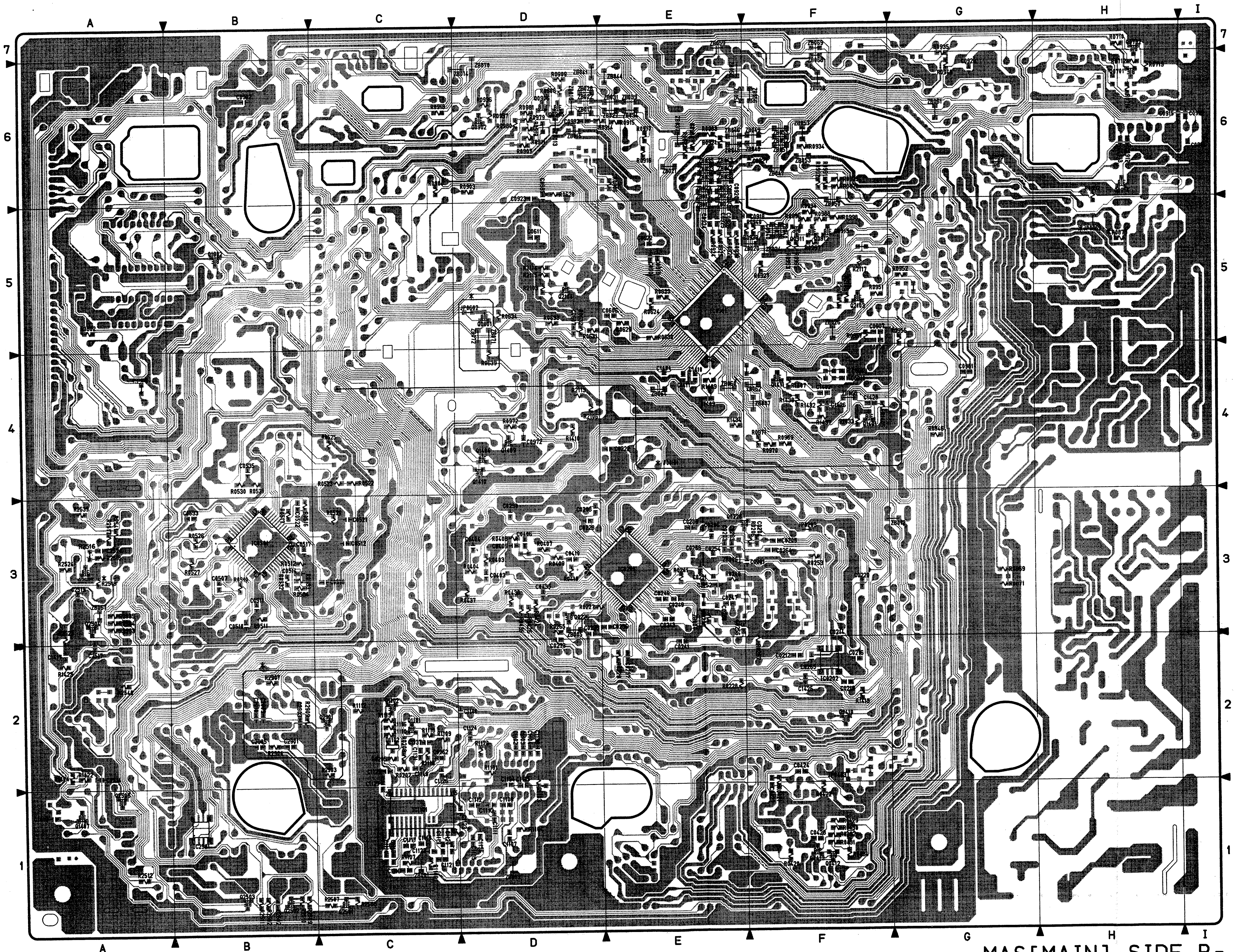
Symbol No.	Parts Location
R2541	B-3A
R2542	A-4B
R2901	A-2B
R2902	A-2C
R2903	B-2C
R2904	B-2B
R2905	A-2B
R2906	A-2B
R2907	B-2B
R2908	A-2B
R2909	B-2B
RT	
RT1801	A-5A
S	
S2101	A-5D
S2102	A-4G
S2103	A-6C
T	
T0401	A-1F
T0851	A-4H
X	
X0201	A-4E
X0901	A-5F
X0902	A-4F
X2901	A-2B
ZB	
ZB0071	B-5D
ZB0072	B-5D
ZD	
ZD0851	A-3H
ZD0861	A-4H
ZD0862	A-5I
ZD0864	A-5H
ZD0901	A-6H
ZD0903	A-4F
ZD0904	A-6H
ZD2501	A-2A
ZD2502	A-3A

MAS[MAIN] – SIDE B – DIFFERENCE TABLE

NOTE: This table is listed the different components marked with asterisks (∗) in the circuit board diagrams.

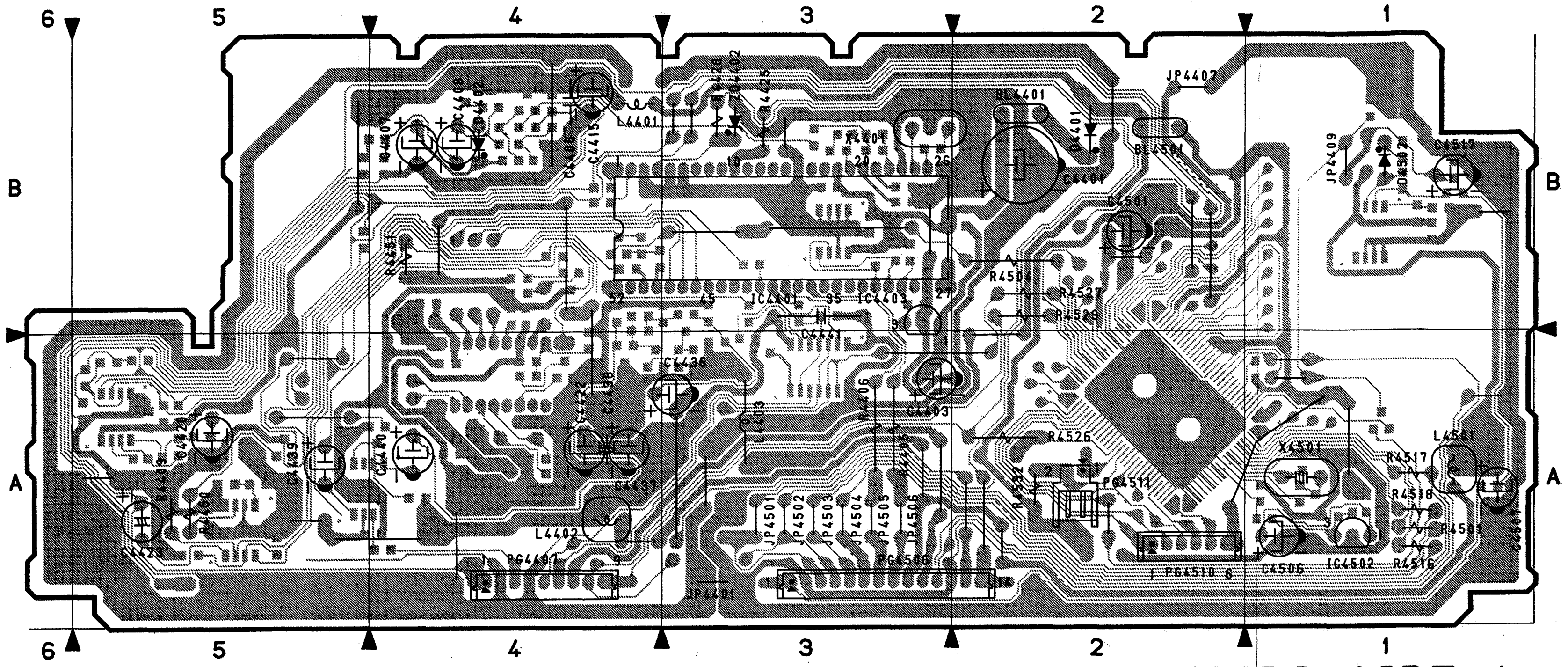
SYMBOL No.	UX615A	UX617A	UX617AW
00HH	×	○	○
C2901	○	×	×
C2903	○	×	×
C2905	○	×	×
C2909	○	×	×
C2910	○	×	×
JP0602	○	×	×
JP0852	×	×	○
Q0601	×	○	○
Q2901	○	×	×
R0639	×	○	○
R0878	○	○	×
R2903	○	×	×
R2904	○	×	×
R2907	○	×	×
R2909	○	×	×
R2518	○	×	×
ZB071	×	○	○
ZB072	×	○	○

MAS CIRCUIT BOARD [SIDE B]

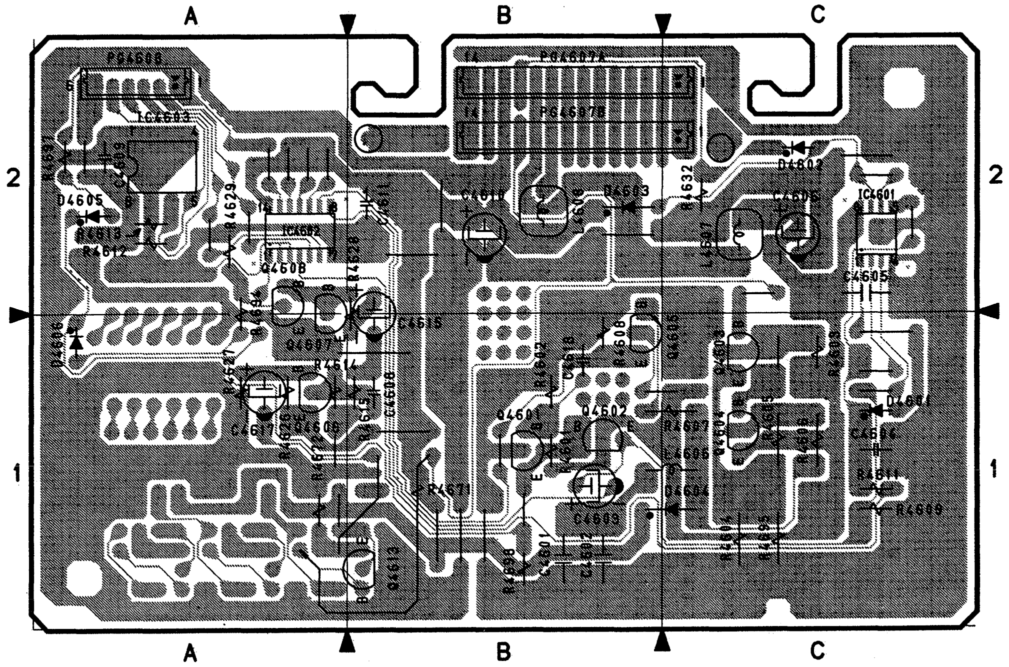

A
B
C
D
E
F
G
H
I
7
6
5
4
3
2
1

MAS[MAIN]-SIDE B-
[PATTERN No.JA1243-8]

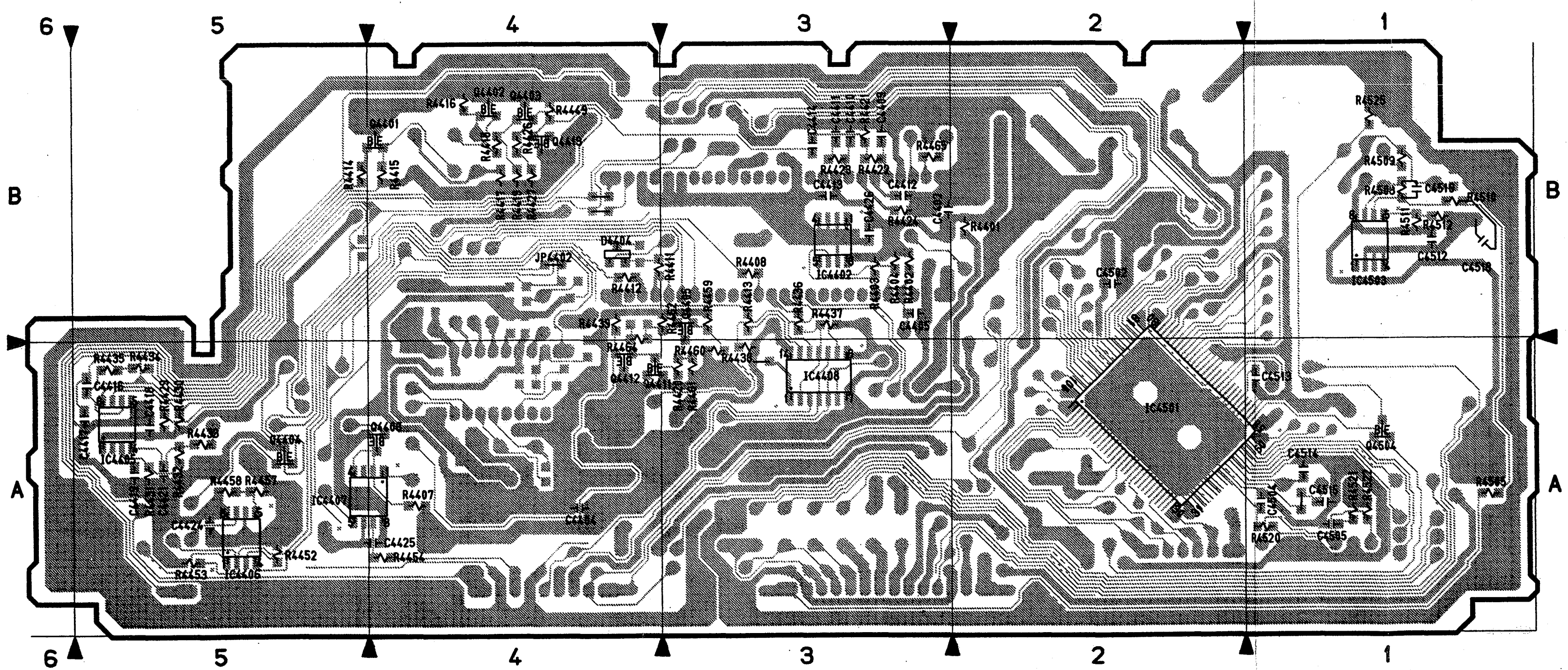
CFN. CF2 CIRCUIT BOARDS


6
5
4
3
2
1
B
A
IC4401
IC4403
IC4502
X4501
PG4401
PG4506
PG4510
PG4511
JP4401
JP4407
BL4401
BL4501
L4401
L4402
L4501
C4401
C4506
Q4501
Q4503

CFN[NAVI./CCD]-SIDE·A-


A
B
C
2
1
PG4608
PG4607A
PG4607B
IC4601
IC4603
IC4604
C4605
C4615
D4602
D4604
D4605
Q4601
Q4602
Q4603
Q4606
Q4607
Q4608
Q4613

CF2[SUB]
[PATTERN No.JA1357-2]


6
5
4
3
2
1
B
A
IC4501
IC4503
IC4402
IC4404
IC4405
IC4406
IC4407
IC4408
Q4401
Q4402
Q4403
Q4404
Q4412
JP4402
R4401
R4407
R4452
R4525
C4504
C4513
C4514

CFN[NAVI./CCD]-SIDE·B-
[PATTERN No.JA1319-5]

IDENTIFICATION OF PARTS LOCATION

CFN [NAVI./CCD]

Symbol No.	Parts Location
BL	
BL4401	A-2B
BL4501	A-2B
C	
C4401	A-2B
C4402	B-3B
C4403	A-3A
C4404	B-4A
C4405	B-3B
C4406	A-4B
C4407	A-4B
C4408	A-4B
C4409	B-3B
C4410	B-3B
C4411	B-3B
C4412	B-3B
C4413	B-3B
C4414	B-3B
C4415	A-4B
C4416	B-5A
C4417	B-5A
C4418	B-5A
C4419	B-5A
C4420	A-5A
C4421	B-5A
C4422	A-4A
C4423	A-5A
C4424	B-1E
C4425	B-4A
C4426	B-3B
C4436	A-3A
C4437	A-4A
C4438	A-4A
C4439	A-5A
C4440	A-4A
C4441	A-3B
C4501	A-2B
C4502	B-2B
C4504	B-1A
C4505	B-1A
C4506	A-1A
C4507	A-1A
C4512	B-1B
C4513	B-1A
C4514	B-1A
C4515	B-1A
C4517	A-1B
C4518	B-1B
C4519	B-1B
D	
D4401	A-2B
D4402	A-4B
D4404	B-4B
D4502	A-1B
IC	
IC4401	A-3B
IC4402	B-3B
IC4403	A-3B
IC4405	B-5A
IC4406	B-5A
IC4407	B-4A
IC4408	B-3A
IC4501	B-2A
IC4502	A-1A
IC4503	B-1B
L	
L4401	A-4B
L4402	A-4A
L4403	A-3A
L4501	A-1A
PG	
PG4407	A-4A
PG4506	A-3A
PG4511	A-2A
PG5410	A-2A
Q	
Q4401	B-4B
Q4402	B-4B
Q4403	B-4B
Q4404	B-5A
Q4405	B-3B
Q4408	B-4A
Q4411	B-4A
Q4412	B-4A
Q4413	B-4B
Q4504	B-1A
R	
R4401	B-2B
R4402	B-3B
R4403	B-3B
R4404	B-3B
R4405	A-3A
R4406	A-3A
R4407	B-4A
R4408	B-3B
R4409	A-5A
R4411	B-4B
R4412	B-4B
R4413	B-3B
R4414	B-5B
R4415	B-4B
R4416	B-4B
R4417	B-4B
R4418	B-4B
R4419	B-4B
R4420	B-3A
R4421	B-3B
R4422	B-3B
R4423	B-3B
R4424	B-3B
R4425	A-3B
R4426	B-4B
R4427	B-4B
R4428	A-3B
R4429	B-5A
R4430	B-5A
R4431	B-5A
R4432	B-5A
R4433	B-5A
R4434	B-5A
R4435	B-5A
R4436	B-3B
R4437	B-3B
R4438	B-3A
R4439	B-4B
R4449	B-4B
R4450	A-5A
R4451	A-4B
R4452	B-5A
R4453	B-5A
R4454	B-4A
R4457	B-5A
R4458	B-5A
R4459	B-3B
R4460	B-3A
R4461	B-3A
R4462	B-3B
R4464	B-4A
R4465	B-3B
R4501	A-1A
R4504	A-2B
R4505	B-1A
R4508	B-1B
R4509	B-1B
R4510	B-1B
R4511	B-1B
R4512	B-1B
R4516	A-1A
R4517	A-1A
R4518	A-1A
R4520	B-1A
R4521	B-1A
R4522	B-1A
R4525	B-1B
R4526	A-2A
R4527	A-2B
R4529	A-2B
R4532	A-2A
X	
X4401	A-3B
X4501	A-1A
ZD	
ZD4402	A-3B

CF2 [SUB]

Symbol No.	Parts Location
C	
C4601	1B
C4602	1B
C4603	1B
C4604	1C
C4605	2C
C4606	2C
C4608	1B
C4609	2A
C4610	2B
C4611	2B
C4615	1B
C4617	1A
C4618	1B
D	
D4601	1C
D4602	2C
D4603	2B
D4604	1C
D4605	2A
D4606	1A
IC	
IC4601	2C
IC4602	2A
IC4603	2A
L	
L4606	1C
L4607	2C
L4608	2B
PG	
PG4607A	2B
PG4607B	2B
PG4608	2A
Q	
Q4601	1B
Q4602	1B
Q4603	1C
Q4604	1C
Q4605	1B
Q4606	1A
Q4607	1A
Q4608	2A
Q4613	1B
R	
R4601	1B
R4602	1B
R4603	1C
R4604	1C
R4605	1C
R4606	1C
R4607	1C
R4608	1B
R4609	1C
R4611	1C
R4612	2A
R4613	2A
R4614	1A
R4615	1B
R4626	1A
R4627	1A
R4628	2B
R4629	2A
R4632	2C
R4671	1B
R4672	1A
R4694	2A
R4695	1C
R4697	2A
R4698	1B

CHAPTER 7

TROUBLE DISPLAY, BLOCK DIAGRAMS AND MICROPROCESSOR PIN FUNCTION TABLE

◆ Trouble Display Function

This VCR has a function which displays mechanism malfunctions, etc. in the LCD display. Use this function to analyze the cause when the power is shut off due to a malfunction, etc. in the mechanism.
Two types of information are displayed, (1) The operation mode when the malfunction occurred, (2) Malfunction Codes.

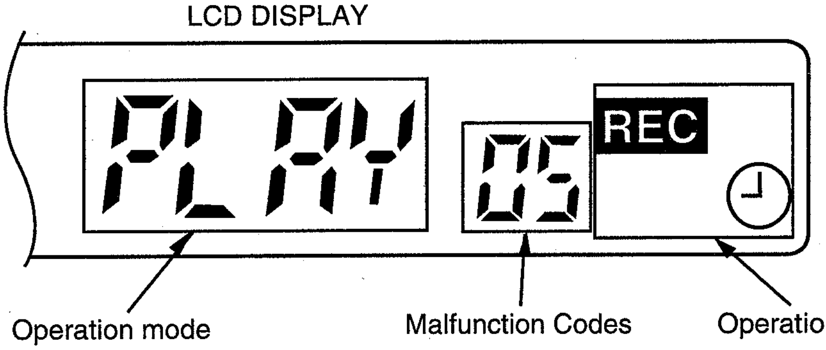
The details of the malfunction are displayed as follows.

Procedure to display a malfunction

Press the "CHANNEL ▼ " button on the VCR when the power is turned off and hold it ; the malfunction code is displayed while the button is held depressed.

Procedure to clear the malfuntion display

Press the "PLAY" button on the VCR and hold it, than press the microprocessor "RESET" button to initialize the trouble display.
* Hold the "PLAY" button depressed and release it after the display lights.



【Display of Details of Malfunction】

Displayed No.	Item	Details
00	No malfunction	
01	FL mechanism lock	Malfunction in insertion/ejection of cassette
02	Capstan lock	Malfunction of capstan motor drive during tape unloading
04	Reel lock	Reel rotation trouble when tape is running
05	Cylinder lock	Cylinder rotation malfunction
07	Loading mechanism lock	Malfunction in shifting mechanism mode
16	Servo lock	Shorting of 5V detected

【Mode Display when Malfunction Has Occurred】

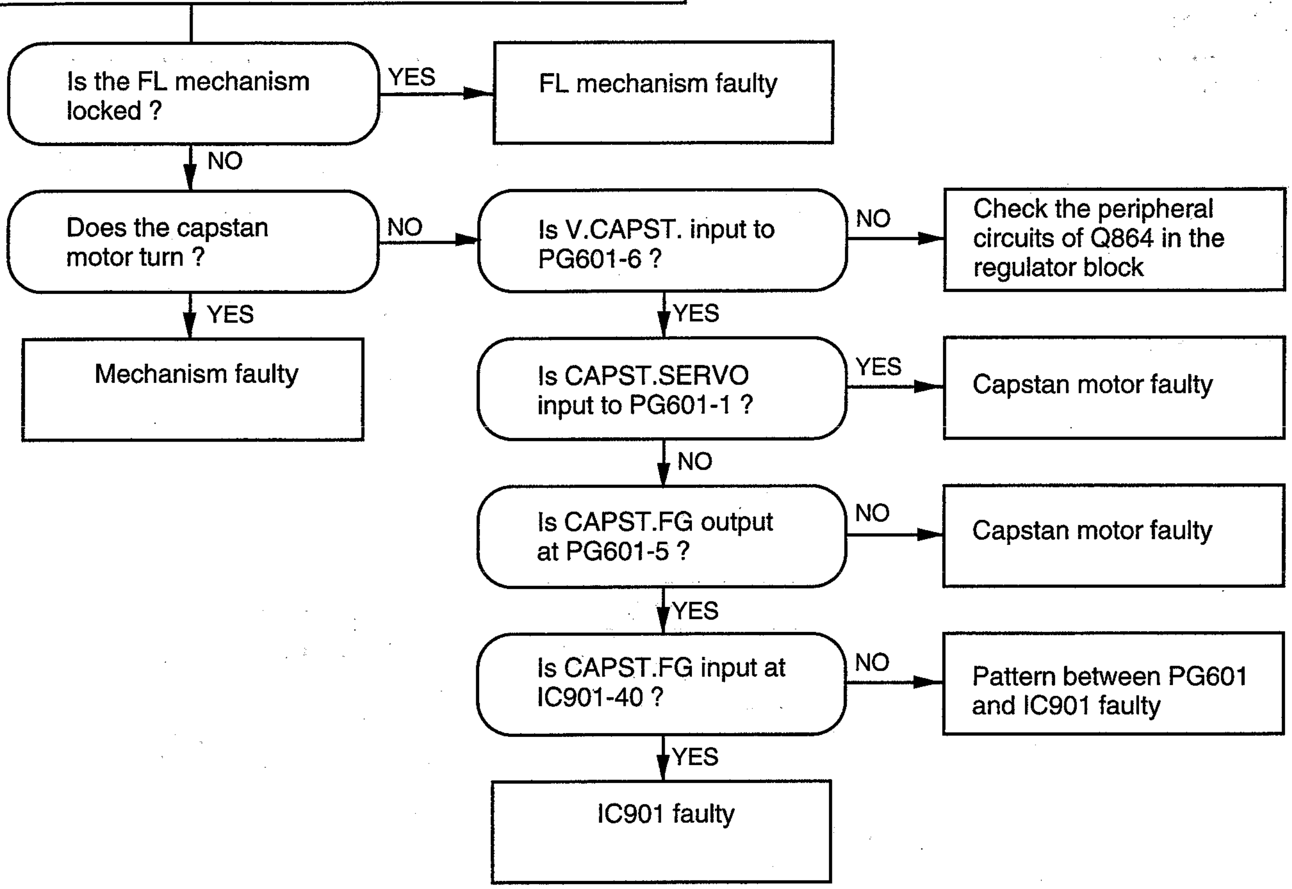
Mode	Display
Stop	No display
Fast forward	**FF**
Rewind	**REW**
Recording	**REC**
Timer recording	◷ **REC**
Recording pause	**REC** (flashes)

Mode	Display
Playback	**PLAY**
Forward search	**SRCH**
Reverse search	**-SRCH**
Slow	**SLOW**
Still play	**STILL**

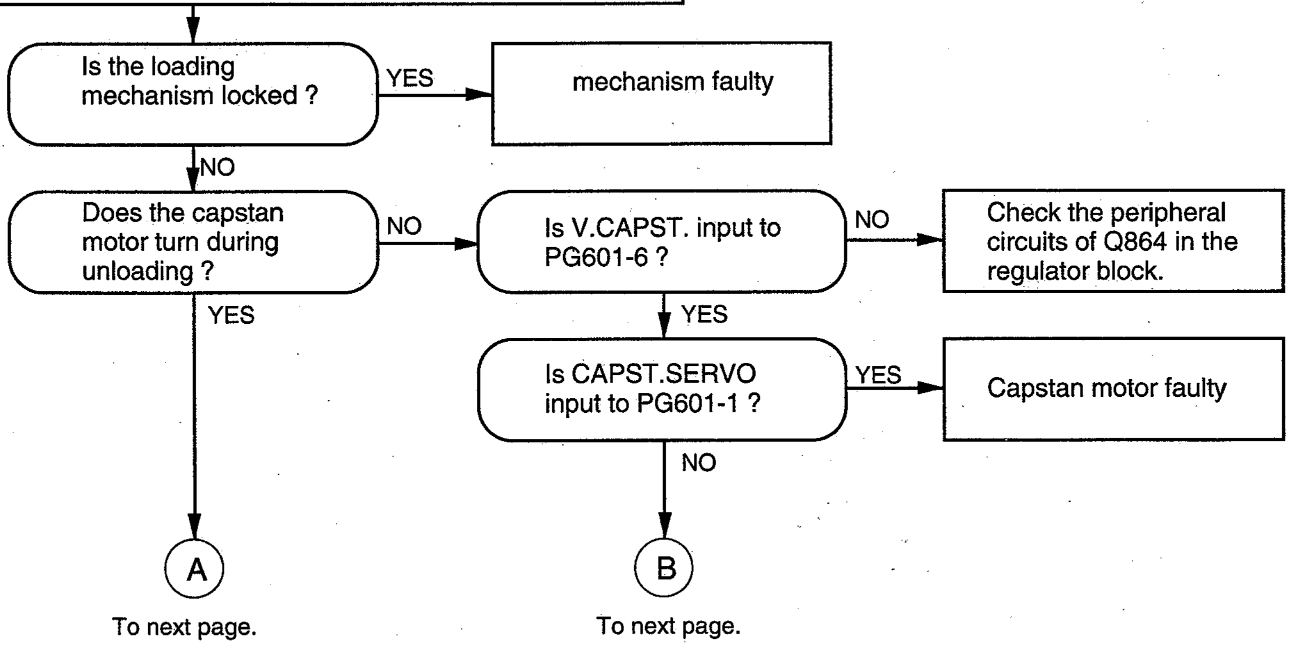
No symbols are displayed if the malfunction occurred when a cassette was inserted or ejected, or the power was switched on from off, and off from on.

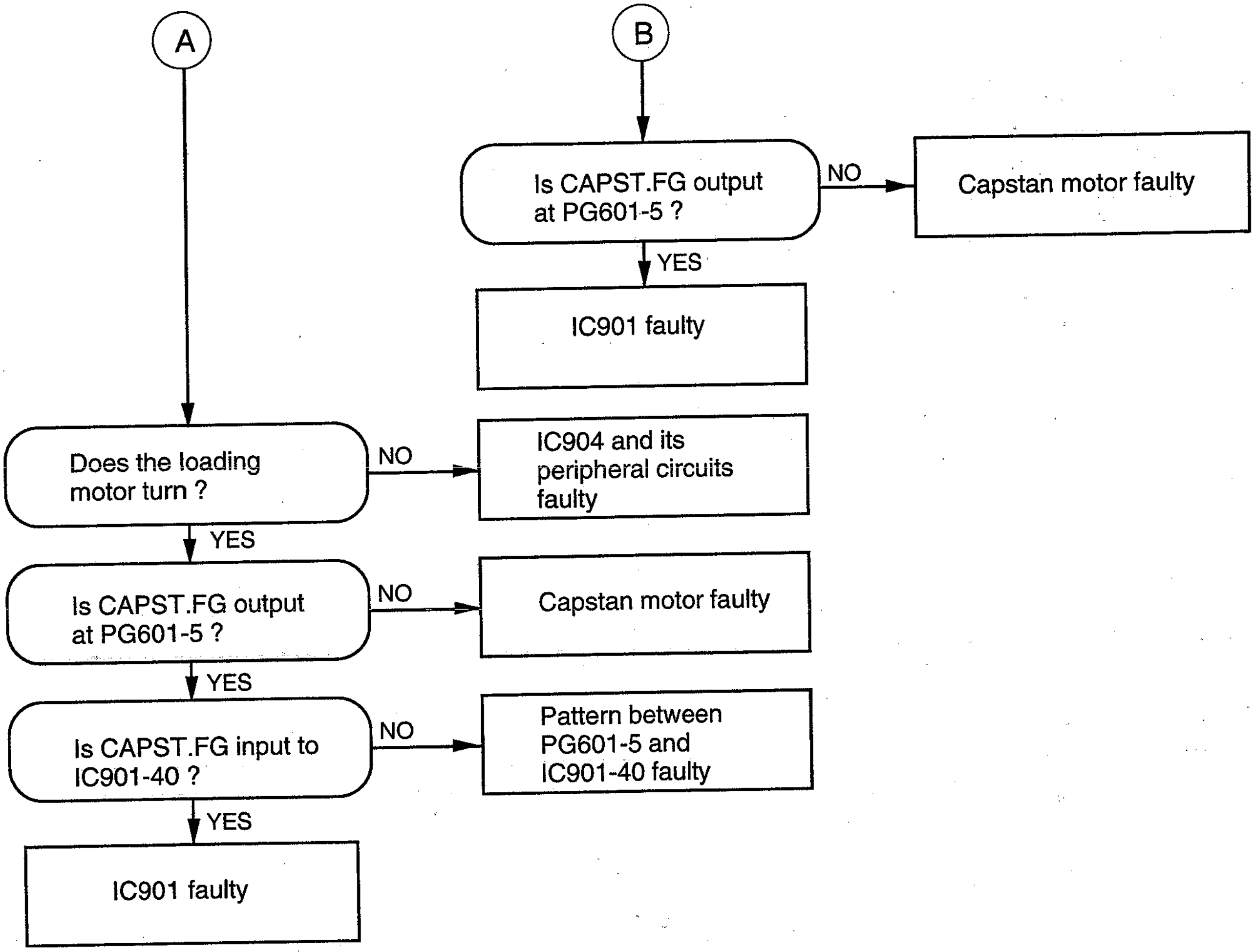
Troubleshooting According to Malfunction Display

1. If "01" Appears in the Display

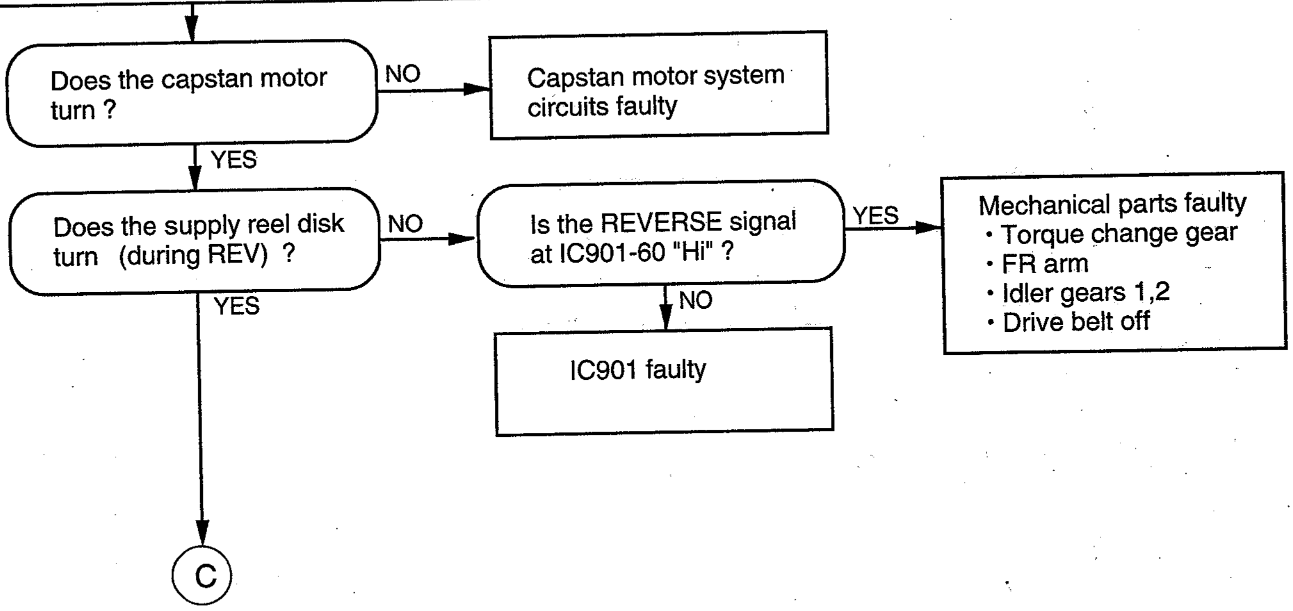

Is the FL mechanism locked ?
YES
FL mechanism faulty
NO
Does the capstan motor turn ?
NO
Is V.CAPST. input to PG601-6 ?
NO
Check the peripheral circuits of Q864 in the regulator block
YES
Mechanism faulty
YES
Is CAPST.SERVO input to PG601-1 ?
YES
Capstan motor faulty
NO
Is CAPST.FG output at PG601-5 ?
NO
Capstan motor faulty
YES
Is CAPST.FG input at IC901-40 ?
NO
Pattern between PG601 and IC901 faulty
YES
IC901 faulty

2. If "02" Appears in the Display

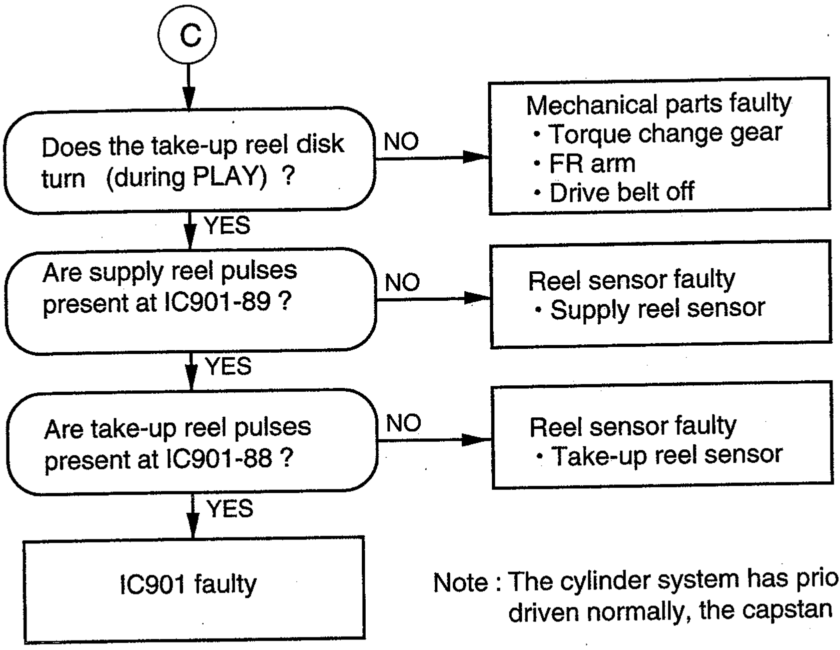

Is the loading mechanism locked ?
YES
mechanism faulty
NO
Does the capstan motor turn during unloading ?
NO
Is V.CAPST. input to PG601-6 ?
NO
Check the peripheral circuits of Q864 in the regulator block.
YES
YES
Is CAPST.SERVO input to PG601-1 ?
YES
Capstan motor faulty
NO
A
To next page.
B
To next page.


A
B
Is CAPST.FG output at PG601-5 ?
NO
Capstan motor faulty
YES
IC901 faulty
Does the loading motor turn ?
NO
IC904 and its peripheral circuits faulty
YES
Is CAPST.FG output at PG601-5 ?
NO
Capstan motor faulty
YES
Is CAPST.FG input to IC901-40 ?
NO
Pattern between PG601-5 and IC901-40 faulty
YES
IC901 faulty

3. If "04" Appears in the Display

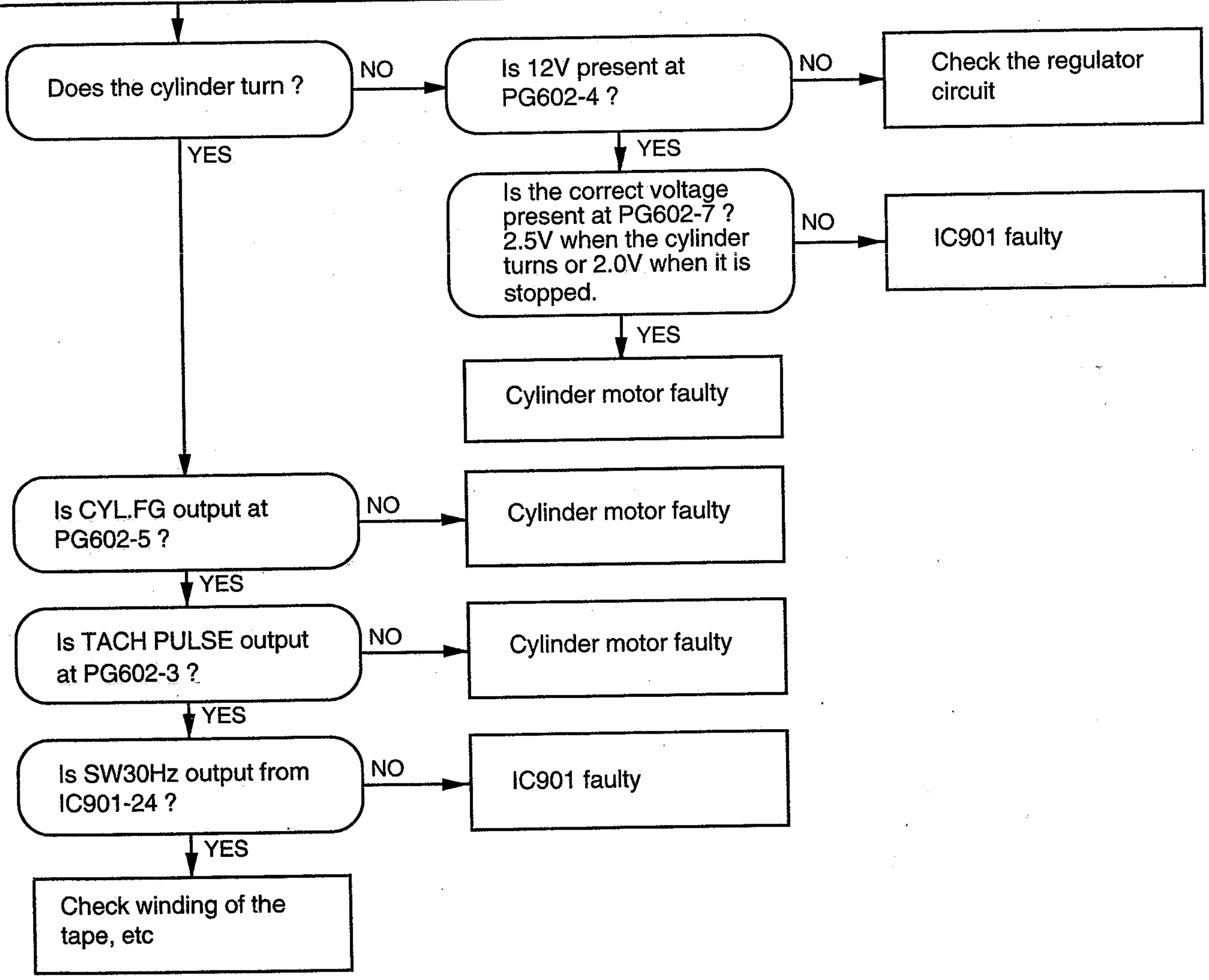

Does the capstan motor turn ?
NO
Capstan motor system circuits faulty
YES
Does the supply reel disk turn (during REV) ?
NO
Is the REVERSE signal at IC901-60 "Hi" ?
YES
Mechanical parts faulty
• Torque change gear
• FR arm
• Idler gears 1,2
• Drive belt off
NO
IC901 faulty
YES
C

To next page.

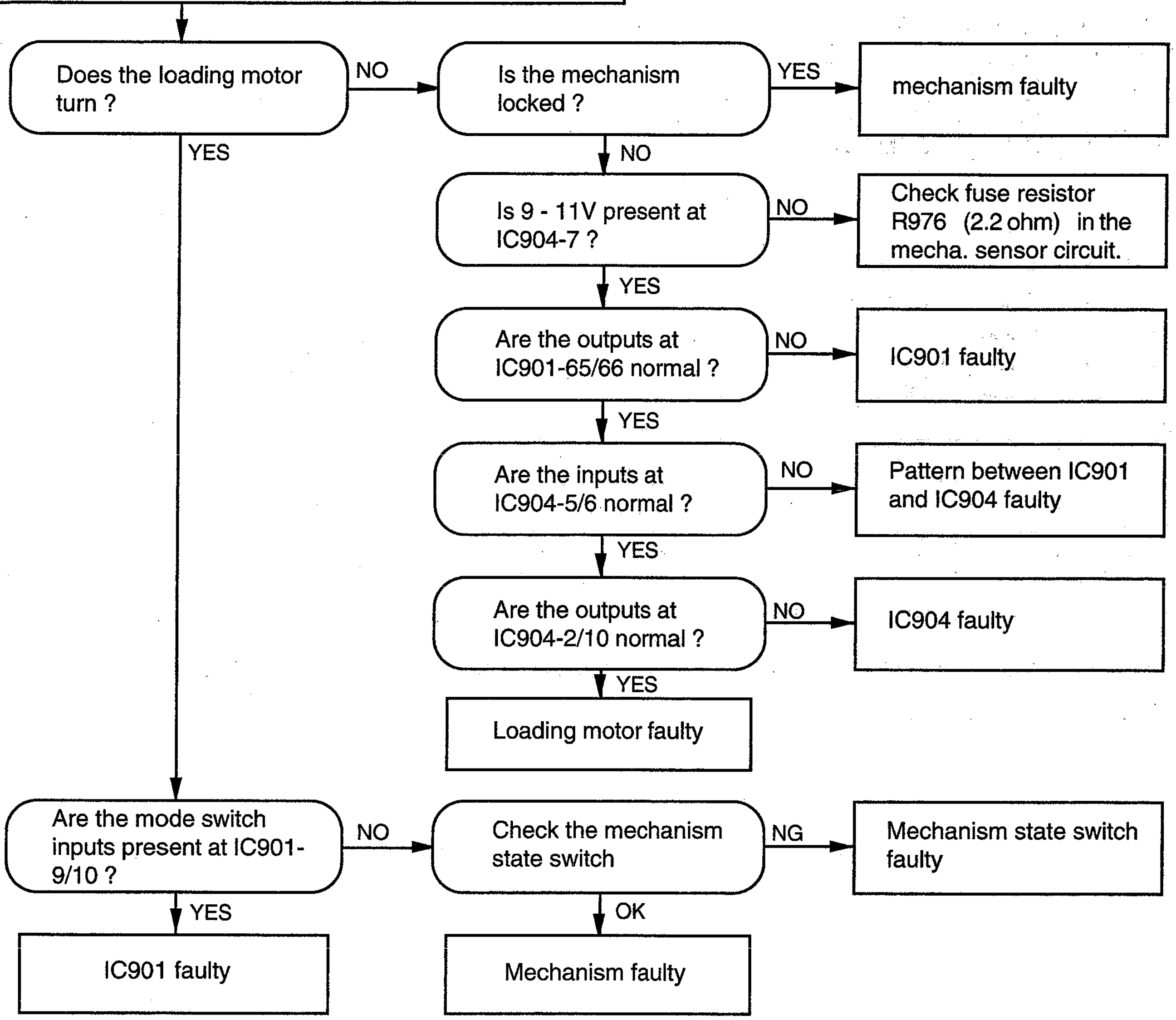

C
Does the take-up reel disk turn (during PLAY) ?
NO
Mechanical parts faulty
• Torque change gear
• FR arm
• Drive belt off
YES
Are supply reel pulses present at IC901-89 ?
NO
Reel sensor faulty
• Supply reel sensor
YES
Are take-up reel pulses present at IC901-88 ?
NO
Reel sensor faulty
• Take-up reel sensor
YES
IC901 faulty

Note : The cylinder system has priority. If the cylinder motor is not driven normally, the capstan motor will not be driven.

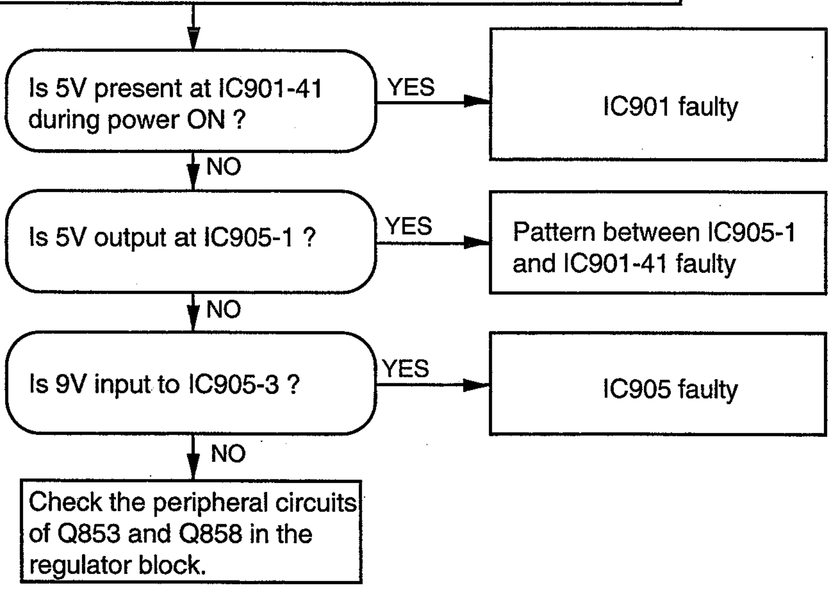
4. If "05" Appears in the Display


Does the cylinder turn ?
NO
Is 12V present at PG602-4 ?
NO
Check the regulator circuit
YES
Is the correct voltage present at PG602-7 ? 2.5V when the cylinder turns or 2.0V when it is stopped.
NO
IC901 faulty
YES
Cylinder motor faulty
YES
Is CYL.FG output at PG602-5 ?
NO
Cylinder motor faulty
YES
Is TACH PULSE output at PG602-3 ?
NO
Cylinder motor faulty
YES
Is SW30Hz output from IC901-24 ?
NO
IC901 faulty
YES
Check winding of the tape, etc

5. If "07" Appears in the Display


Does the loading motor turn ?
NO
Is the mechanism locked ?
YES
mechanism faulty
NO
Is 9 - 11V present at IC904-7 ?
NO
Check fuse resistor R976 (2.2 ohm) in the mecha. sensor circuit.
YES
Are the outputs at IC901-65/66 normal ?
NO
IC901 faulty
YES
Are the inputs at IC904-5/6 normal ?
NO
Pattern between IC901 and IC904 faulty
YES
Are the outputs at IC904-2/10 normal ?
NO
IC904 faulty
YES
Loading motor faulty
YES
Are the mode switch inputs present at IC901-9/10 ?
NO
Check the mechanism state switch
NG
Mechanism state switch faulty
YES
IC901 faulty
OK
Mechanism faulty

6. If "16" Appears in the Display


Is 5V present at IC901-41 during power ON ?
YES
IC901 faulty
NO
Is 5V output at IC905-1 ?
YES
Pattern between IC905-1 and IC901-41 faulty
NO
Is 9V input to IC905-3 ?
YES
IC905 faulty
NO
Check the peripheral circuits of Q853 and Q858 in the regulator block.

Microprocessor Pin Function Tables

1. LCD DRIVER (IC1701)

Pin No.	I/O	Active Level	Abbreviation	Function
1	O	Pulse	SEGMENT (1)	LCD segment control outputs.
2 | | | 31	O O	Pulse | | | Pulse	SEGMENT (2) | | | SEGMENT (31)	
32	O	Pulse	SEGMENT (32)	
33	O	Pulse	COM1	LCD common (COM) control outputs.
34	O	Pulse	COM2	
35	O	Pulse	COM3	
36	I	Lo	RESET (L)	Initializes the LCD-uP when power is supplied.
37	I	Hi	VDD	A5V power input.
38	I	-	VDD 1	LCD drive bias.
39	I	-	VDD 2	LCD drive bias.
40	-	Lo	VSS	Ground.
41	I/O	-	OSC	Generates a 32kHz signal for key scanning.
42	I	Lo	LCD. LOAD (L)	LOAD signal between the M-uP and LCD-uP. "Lo" input enables chip select.
43	I	Pulse	CLOCK (M-LCD)	The data transferred from the M-uP, synchronized with the clock signal.
44	I	Pulse	DATA (M-LCD)	

2. MAIN uP (IC901)

<table>
<tr><th>Pin No.</th><th>I/O</th><th>Active Level</th><th>Abbreviation</th><th>Function</th></tr>
<tr><td>1</td><td>O</td><td>Hi</td><td>BACKLIGHT</td><td>LCD backlight switching signal.</td></tr>
<tr><td>2</td><td>-</td><td>-</td><td>GND</td><td>Ground.</td></tr>
<tr><td>3</td><td>I</td><td>A/D</td><td>SHUTTLE 2</td><td rowspan="2">Inputs from the shuttle dial switches. The shuttle speed and direction are determined.</td></tr>
<tr><td>4</td><td>I</td><td>A/D</td><td>SHUTTLE 1</td></tr>
<tr><td>5</td><td>I</td><td>A/D</td><td>KEY IN</td><td>Key matrix input.</td></tr>
<tr><td>6</td><td>I</td><td>A/D</td><td>FL/TAB</td><td>Cassette position/erase prevention tab detection input. Hi : TAB SW OFF (with tab) , Mid : TAB SW ON (without tab) , Lo : When cassette is being inserted/ejected. When a cassette without its erase prevention tab is inserted, recording is inhibited, and when the timer is programmed, it is ejected automatically.</td></tr>
<tr><td>7</td><td>I</td><td>Lo</td><td>POWER STOP (L)</td><td>When A5V voltage drops and "Lo" is input, the M-uP detects that a power failure has occurred.</td></tr>
<tr><td>8</td><td>I</td><td>Hi</td><td>S-CURVE</td><td>Detects the AFT (S-CURVE) signal from the IF unit to fine tune to a station.</td></tr>
<tr><td>9</td><td>I</td><td>A/D</td><td>M. STATE 3/4</td><td rowspan="2">The signals which detect the mechanism state are input to control the loading motor.
<table>
<tr><th>Pin</th><th>EJECT</th><th>UNLOAD</th><th>REV.</th><th>R. SLOW</th><th>SLOW</th><th>R/P</th><th>STOP2</th><th>FF/REW</th></tr>
<tr><td>13</td><td>0</td><td>2.5</td><td>1.8</td><td>2.5</td><td>3.05</td><td>3.05</td><td>2.5</td><td>0</td></tr>
<tr><td>14</td><td>1.8</td><td>3.05</td><td>0</td><td>0</td><td>0</td><td>1.8</td><td>2.5</td><td>3.05</td></tr>
</table></td></tr>
<tr><td>10</td><td>I</td><td>A/D</td><td>M. STATE 1/2</td></tr>
<tr><td>11</td><td>I</td><td>A/D</td><td>ENV. (VIDEO)</td><td rowspan="2">Audio and video envelope level inputs for autotracking.</td></tr>
<tr><td>12</td><td>I</td><td>A/D</td><td>ENV. (AUDIO)</td></tr>
<tr><td>13</td><td>I</td><td>A/D</td><td>MODEL SW/ CM SKIP</td><td>Model switching control. [VT-UX615A]
The Main-uP retrieves the commercial message positions detected by the Commercial Free-uP. [VT-UX617A,AW]</td></tr>
<tr><td>14</td><td>I</td><td>H/MH/ ML/L</td><td>MTS MODE</td><td>Lo : Stereo + SAP signal input, Mid low : Mono + SAP signal inout, Mid high : Stereo signal input, Hi : Mono signal input.</td></tr>
<tr><td>15</td><td>I</td><td>-</td><td>A5V</td><td>Connected to A5V.</td></tr>
<tr><td>16</td><td>I</td><td>Lo</td><td>RESET (L)</td><td>Initializes the M-uP when power is supplied.</td></tr>
<tr><td>17</td><td>O</td><td>Hi</td><td>MONO OUT</td><td>Output to control the MTS decoder output mode to mono.</td></tr>
<tr><td>18</td><td>O</td><td>Hi</td><td>TUNER LOAD</td><td>A data line is provided between the M-uP and U/V tuner and the uP sets the LOAD pin to "Hi" when transfering data and holds it until transfer is completed.</td></tr>
<tr><td>19</td><td>O</td><td>Lo/Hi</td><td>L1 (Lo) /L2</td><td>L1/L2 switching control signal output.</td></tr>
<tr><td>20</td><td>O</td><td>Lo/Hi</td><td>CONV.CH-3/CH-4</td><td>CH-3/CH-4 switching control signal output.</td></tr>
<tr><td>21</td><td>O</td><td>Hi/Lo</td><td>TV (Lo) /VCR</td><td>RF converter (VCR/TV switching) control signal output.</td></tr>
<tr><td>22</td><td>I</td><td>-</td><td>B5V</td><td>Connected to B5V.</td></tr>
<tr><td>23</td><td>O</td><td>Pulse</td><td>SW30Hz-A</td><td>Head switching pulse output for audio circuits.</td></tr>
<tr><td>24</td><td>O</td><td>Pulse</td><td>SW30Hz</td><td>Head switching pulse output.</td></tr>
<tr><td>25</td><td>O</td><td>PWM</td><td>CAPST. PWM</td><td rowspan="2">Cylinder and capstan motor servo control outputs.</td></tr>
<tr><td>26</td><td>O</td><td>PWM</td><td>CYL. PWM</td></tr>
<tr><td>27</td><td>O</td><td>Hi</td><td>V.PULSE</td><td>Artificial V sync signal for trick play.</td></tr>
<tr><td>28</td><td>O</td><td>Pulse</td><td>C.ROTARY</td><td>Chroma rotation control signal.</td></tr>
<tr><td>29</td><td>O</td><td>Hi/Lo</td><td>H.AMP SW</td><td>SP/EP head switching control signal (pulse during trick play) .</td></tr>
<tr><td>30</td><td>I</td><td>Hi/Lo</td><td>COMP</td><td>SP/EP head switching control signal (pulse during trick play) .</td></tr>
<tr><td>31</td><td>I/O</td><td>Pulse</td><td>CTL (+)</td><td rowspan="2">CTL signal input/output.</td></tr>
<tr><td>32</td><td>I/O</td><td>Pulse</td><td>CTL (-)</td></tr>
<tr><td>33</td><td>-</td><td>-</td><td>GND</td><td>Ground.</td></tr>
<tr><td>34</td><td>I</td><td>Pulse</td><td>CTL AMP 1</td><td rowspan="3">CTL amp inputs.</td></tr>
<tr><td>35</td><td>I</td><td>Pulse</td><td>CTL AMP 2</td></tr>
<tr><td>36</td><td>I</td><td>Pulse</td><td>CTL AMP 3</td></tr>
<tr><td>37</td><td>O</td><td>Pulse</td><td>CTL AMP (O)</td><td>CTL amp outputs.</td></tr>
<tr><td>38</td><td>I</td><td>Pulse</td><td>CYL.FG</td><td>Cylinder FG (CYL.FG) pulse input. Controls the cylinder speed during recording and playback.</td></tr>
<tr><td>39</td><td>I</td><td>Pulse</td><td>TACH PULSE</td><td>Tach pluse input. Comparison (feedback) signal which controls the recording cylinder phase.</td></tr>
</table>

Pin No.	I/O	Active Level	Abbreviation	Function
40	I	Pulse	CAPST.FG	Capstan FG (CAPST.FG) pulse input. Used to control the capstan motor.
41	I	-	Vcc (SRV)	Connected to 5V.
42	I	-	Vcc (OSD)	Connected to 5V.
43	I	-	C.VIDEO IN	Video signal input.
44	O	-	V.REF	Reference voltage of analog circuits.
45	O	-	C.VIDEO OUT	Video signal output.
46	-	-	CHARA. BIAS	Not used.
47	-	-	AFC LPF	An LPF is attached externally for AFC.
48	-	-	AFC OSC	Oscillator for AFC.
49	-	-	GND	Ground.
50	I	Pulse	DOSC IN	OSD dot clock oscillator.
51	O	Pulse	DOSC OUT	
52	O	-	2 fsc (7.16MHz)	These generate a 7.16MHz signal as the clock signal for the OSD and servo circuit.
53	I	-	2 fsc (7.16MHz)	
54	I	Pulse	C.SYNC	Composite sync signal input. Controls the cylinder speed during recording.
55	O	Hi	BLUE BACK	Blue background control signal output.
56	O	Hi	Hi-Fi MUTE	Hi-Fi audio muting control output during recording.
57	O	Pulse	DATA (M-YC/LA)	Common communication lines with VIDEO/LINEAR AUD. ICs ; data is transferred, synchronized with the clock signal.
58	O	Pulse	CLOCK (M-YC/LA)	
59	O	Lo	PB (L)	Sets the video/audio circuits to the playback mode.
60	O	Hi	REVERSE	Sets the drive direction of the capstan motor to reverse.
61	O	Hi	REC (AUDIO)	Sets the audio circuit to the recording mode.
62	I	Pulse	CTL RESET	Applies reset pulses to the CTL amp during slow and reverse slow play.
63	-	Lo	COPY GUARD	Copy guard ON.
64	O	Pulse	IR OUT	Signal output to the cable and DSS box control circuit.
65	O	Hi	UNLOAD	Loading motor drive signals which set the mechanism to the commanded mode.
66	O	Hi	LOAD	
67	O	Hi	LM CONT.	Flying erase control (not used) /signal to control the voltage applied to the loading motor when forward slow is switched to reverse slow and vice versa.
68	-	-	TEST	Ground
69	I	-	X 2 (32kHz)	These generate a 32.768kHz signal as the clock signal for the VCR's clock.
70	O	-	X 1 (32kHz)	
71	-	-	GND	Ground
72	I	-	OSC 1 (10MHz)	These generate a 10MHz signal as the system clock signal in modes other than back-up.
73	O	-	OSC 2 (10MHz)	
74	O	Hi	LINE MUTE	Audio output muting control.
75	O	Hi/Lo	CAPST. Q.R	Cylinder and capstan motor phase control outputs.
76	O	Hi/Lo	CYL. Q.R	
77	O	Hi	POWER CONT	Power on/off control. When the power switch is operated, a cassette is inserted or a power failure is detected, the internal power supply is switched to be on/off.
78	O	Lo	SP (L)	Tape speed output.
79	O	Hi	V.REC MUTE	Video signal record muting control. Prevents the signal from being supplied to the video heads.
80	O	Lo	EDS/CF LOAD	LOAD signal between the M-uP and AUTO CLOCK IC. [VT-UX615A] LOAD signal between the M-uP and Commercial Free-uP. [VT-UX617A,AW]
81				
82				
	O	Hi	MTS MUTE	Tuner audio muting control.
83	I	Pulse	IR PULSE	Receives the remote control code from the infrared receiver and sets the VCR to the specified mode.
84				
	-	-	EXP. LOAD	Not used.
	O	Hi	REC	Sets the video and audio head amp circuits to the recording mode.

Pin No.	I/O	Active Level	Abbreviation	Function
85	I	Pulse	LINE21	EDS LINE 21H pulse input.
86	I	Lo	REW END (L)	When "Lo" is input from the mechanism sensor, the current mode is released. Two sensors detect the two ends of tape. When "Lo" is input from both sensors, the M-uP detects that a cassette is not loaded in the VCR.
87	I	Lo	FWD END (L)	
88	I	Pulse	T.REEL	Calculates the period of the take-up reel pulse to detect whether or not slack tape is taken up on the reel. If slack tape is not taken up, the M-uP stops the mechanism. The supply reel pulses are used with the take-up reel pulses to calculate the tape remaining time.
89	I	Pulse	S.REEL	
90	I	Lo	CHECK	Checks short-circuits in the 5V/9V power supplies. (This pin goes "Lo" normally when power is off.)
91	O	Hi	ST/SAP OUT	Output to control the MTS decoder so it is set to the SAP mode.
92	I/O	Pulse	DATA (M-R/HA/C)	Common communications lines with the ROM/Hi-Fi AUD/CCD (closed captions decoder) -uP ; data is communicated, synchronized with the clock signal.
93	O	Pulse	CLOCK (M-R/HA/C)	
94	O	H/M/L	V.CAPST.CONT.	This is output in the slow, still, playback, recording, fast forward and rewind modes to control the voltage applied to the capstan motor. Lo : 13.5V, Mid : 9.5V, Hi : 7.5V.
95	O	Pulse	CLOCK (M-T/E/C)	Communication lines with the UV TUNER/EDS IC ; data is transferred, synchronized with the clock signal. [VT-UX615A] Communication lines with the UV TUNER/Commercial Free-uP ; data is transferred, synchronized with the clock signal. [VT-UX617A,AW]
97	O	Pulse	DATA (M-TU/CF)	
96	I	Pulse	DATA (EDS/CF-M)	EDS caption data input. [VT-UX615A] Commercial Free-uP data input. [VT-UX617A,AW]
98	O	Pulse	CLOCK (M-LCD)	Communication lines with the LCD DRIVER ; data is transferred, synchronized with the clock signal.
100	O	Pulse	DATA (M-LCD)	
99	O	Lo	LCD LOAD (L)	LOAD signal between the M-uP and LCD DRIVER.

4. CCD (closed captions decoder) uP (IC4401)

Pin No.	I/O	Active Level	Abbreviation	Function
1	I	Pulse	H. SYNC	Horizontal sync signal input.
2	I	Pulse	V. SYNC	Vertical sync signal input.
3	-	-	GND	Ground.
4	I	Lo	POWER STOP (L)	Power failure detection input (processes communications with the EEPROM as the top priority during power failure) .
5	-	-	GND	Ground.
6	-	-	GND	
7	-	-	-	Outputs which cause the tape navigation operation guide LEDs to light.
8	-	-	-	
9	-	-	-	
10	O	Hi	NAVI. INDI.	
11 | 14	- -	- -	- -	Not used.
15	-	-	GND	Ground.
16	-	-	-	Not used.
17	-	-	-	Not used.
18	I	-	AVcc	Power supply (A5V) .
19	-	-	HFL	Not used. (Grounded via capacitor) .
20	-	-	R.VCO	Not used. (Grounded via resistor) .
21	I	-	V.HOLD	Pin to attach external components for the internal data slicer (circuit for closed captions signals) .
22	I	-	C. VIDEO IN	Composite video signal input.
23	-	-	GND	Ground of internal analog circuits.
24	O	Pulse	X' tal	Pin to connect an external circuit which generates 8MHz clock pulses.
25	O	Pulse	X' tal	
26	-	-	GND	Ground.
27	I	-	Vcc	Power supply (A5V) .
28	-	-	OSC 1	Not used.
29	-	-	OSC 2	
30	I	Lo	RESET (L)	Reset signal input.
31	I/O	Pulse	DATA	Transfers and receives data to/from the NAVI.-EEPROM.
32	O	Pulse	CLOCK	Outputs a clock signal for data transfer/reception.
33 | 38	- -	- -	- -	Not used. (Main- μ P expanding outputs) .
37	I	Pulse	DATA (M-CCD)	Receives data from the M- μ P.
39	I	Pulse	CLOCK (M-CCD)	Clock signal input to synchronize data reception.
40	O	Hi	C.BLNK (REC)	Data area blank creation output during recording (tape navigation mode) .
41	O	Hi	EE MONI	Output to control the monitor output switching when searching for tape navigation data.
42	-	-	-	Not used.
43	-	-	-	Not used.
44	-	-	-	Not used.
45 | 48	- -	- -	- -	Not used.
49	O	Hi	C. BLNK	Character area blank creation output (closed captions mode) .
50	O	Hi	C. CO	Character signal output (closed captions mode) .
51	O	-	-	Not used.
52	O	Hi	C. CO (REC)	Tape data signal output during recording (tape navigation mode) .

◆ Troubleshooting the Switching Regulator

This section summarizes the troubleshooting of defects in the switching regulator. Perform diagnosis, taking each defective phenomenon into consideration. Even if the same defective phenomenon appears, it may be caused by other circuits, not by the switching regulator, so use this item as a reference.

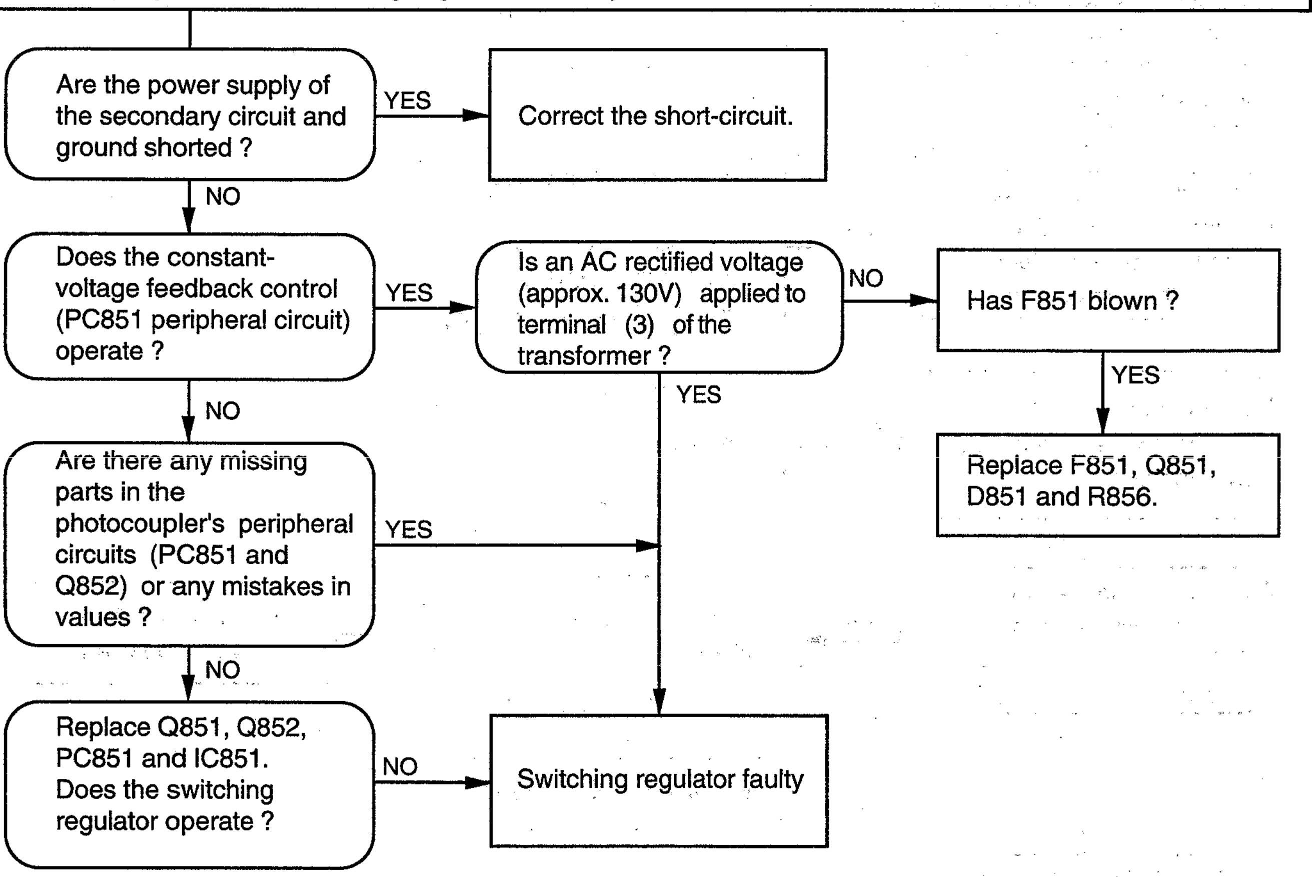
Cautions when checking and repairing the switching regulator circuit

When using test equipment to check the primary circuit (circuit No. 8XX) of the power supply, use a two-pole AC outlet for the test equipment (attach a conversion adapter to the test equipment plug to connect it to a three-pole outlet) .

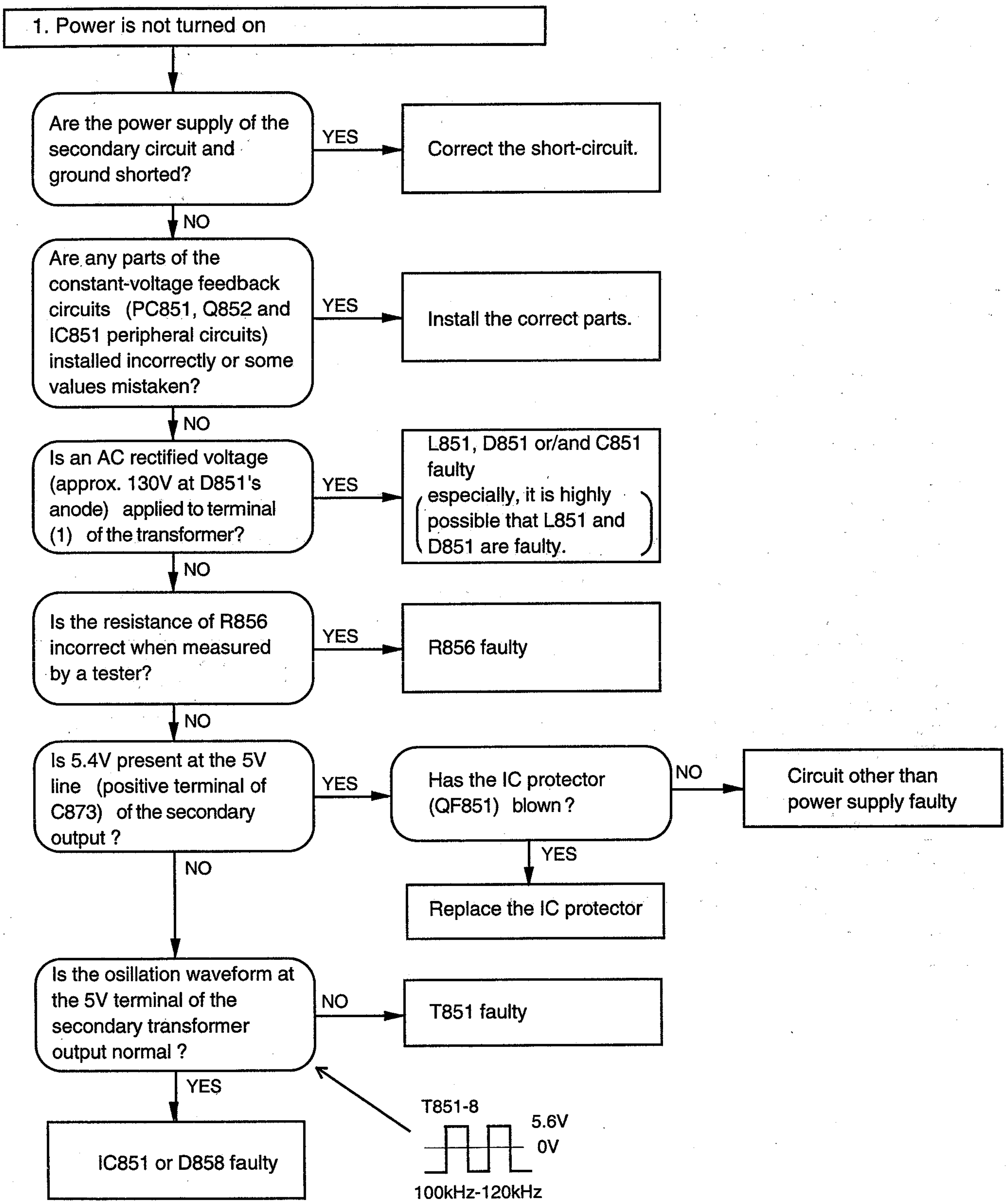
Be careful of electric shock

A heat sink which generates a high voltage is provided with Q851 in the switching regulator block. "HIGH VOLTAGE" is printed on the heat sink. Take great care of this section when servicing or handling the VCR when it is turned on. (Supplement : The heat sinks of Q853 and Q864 do not generate a high voltage.)

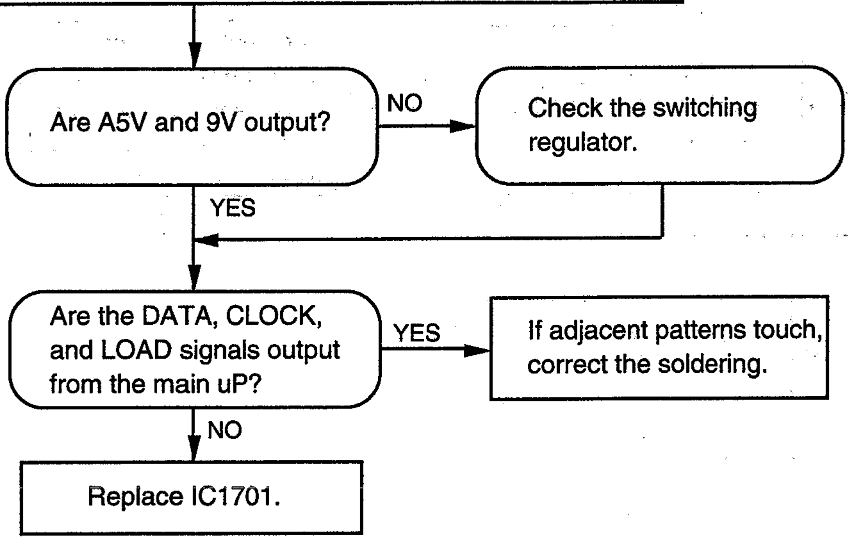
Method to judge that the switching regulator is faulty


Are the power supply of the secondary circuit and ground shorted ?
YES
Correct the short-circuit.
NO
Does the constant-voltage feedback control (PC851 peripheral circuit) operate ?
YES
Is an AC rectified voltage (approx. 130V) applied to terminal (3) of the transformer ?
NO
Has F851 blown ?
YES
Replace F851, Q851, D851 and R856.
YES
NO
Are there any missing parts in the photocoupler's peripheral circuits (PC851 and Q852) or any mistakes in values ?
YES
NO
Replace Q851, Q852, PC851 and IC851. Does the switching regulator operate ?
NO
Switching regulator faulty

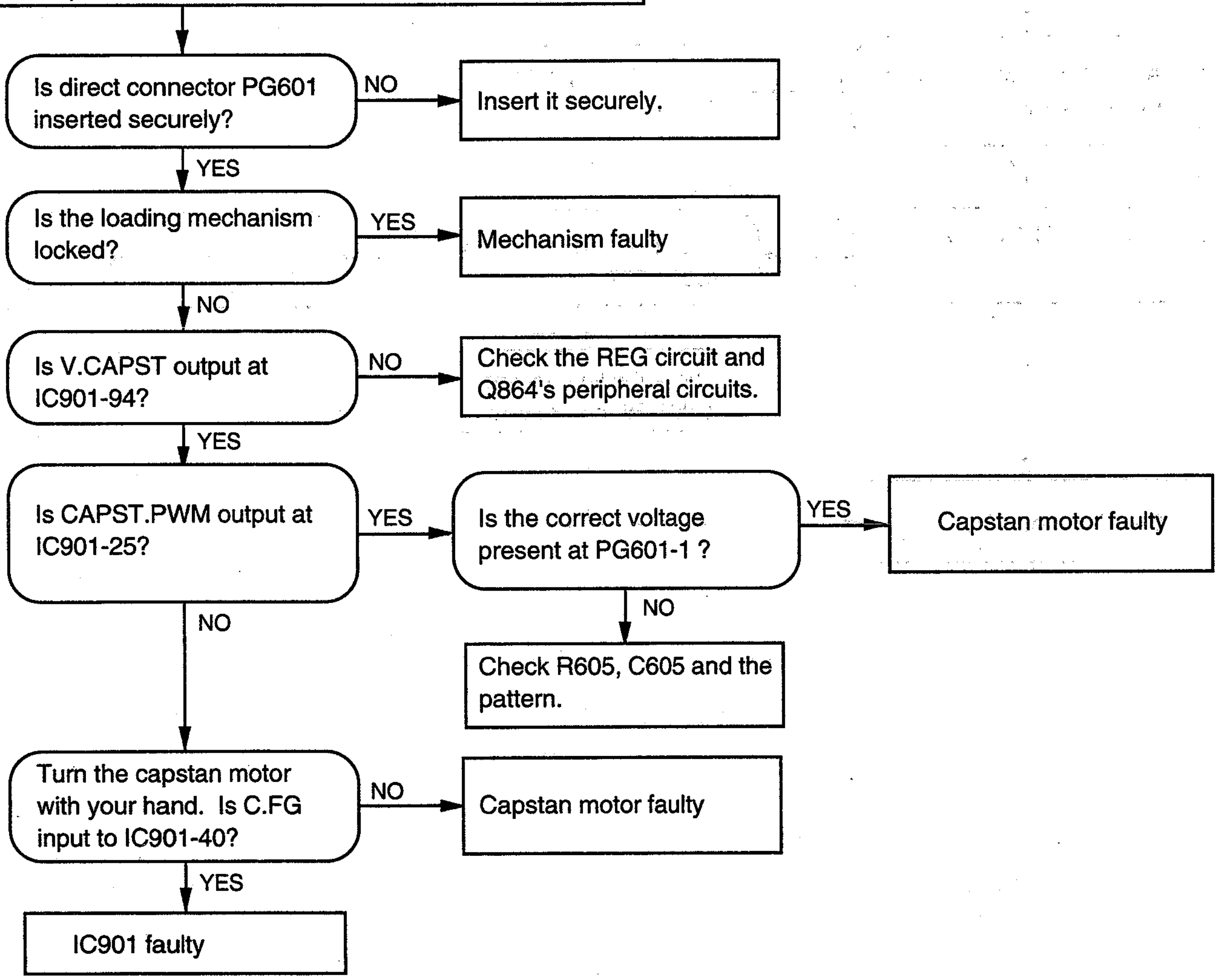
If the switching regulator is normal and there is a defect in another circuit (shorting between the power supply and ground of the secondary circuit), the protective function of IC7101 operates and the power is not turned on. If a defect occurs in the switching regulator, a phenomenon such that the VCR power is not turned on or the power fuse has blown also occurs.


1. Power is not turned on
Are the power supply of the secondary circuit and ground shorted?
YES
Correct the short-circuit.
NO
Are any parts of the constant-voltage feedback circuits (PC851, Q852 and IC851 peripheral circuits) installed incorrectly or some values mistaken?
YES
Install the correct parts.
NO
Is an AC rectified voltage (approx. 130V at D851's anode) applied to terminal (1) of the transformer?
YES
L851, D851 or/and C851 faulty (especially, it is highly possible that L851 and D851 are faulty.)
NO
Is the resistance of R856 incorrect when measured by a tester?
YES
R856 faulty
NO
Is 5.4V present at the 5V line (positive terminal of C873) of the secondary output ?
YES
Has the IC protector (QF851) blown ?
NO
Circuit other than power supply faulty
YES
Replace the IC protector
NO
Is the osillation waveform at the 5V terminal of the secondary transformer output normal ?
NO
T851 faulty
YES
IC851 or D858 faulty
T851-8
5.6V
0V
100kHz-120kHz

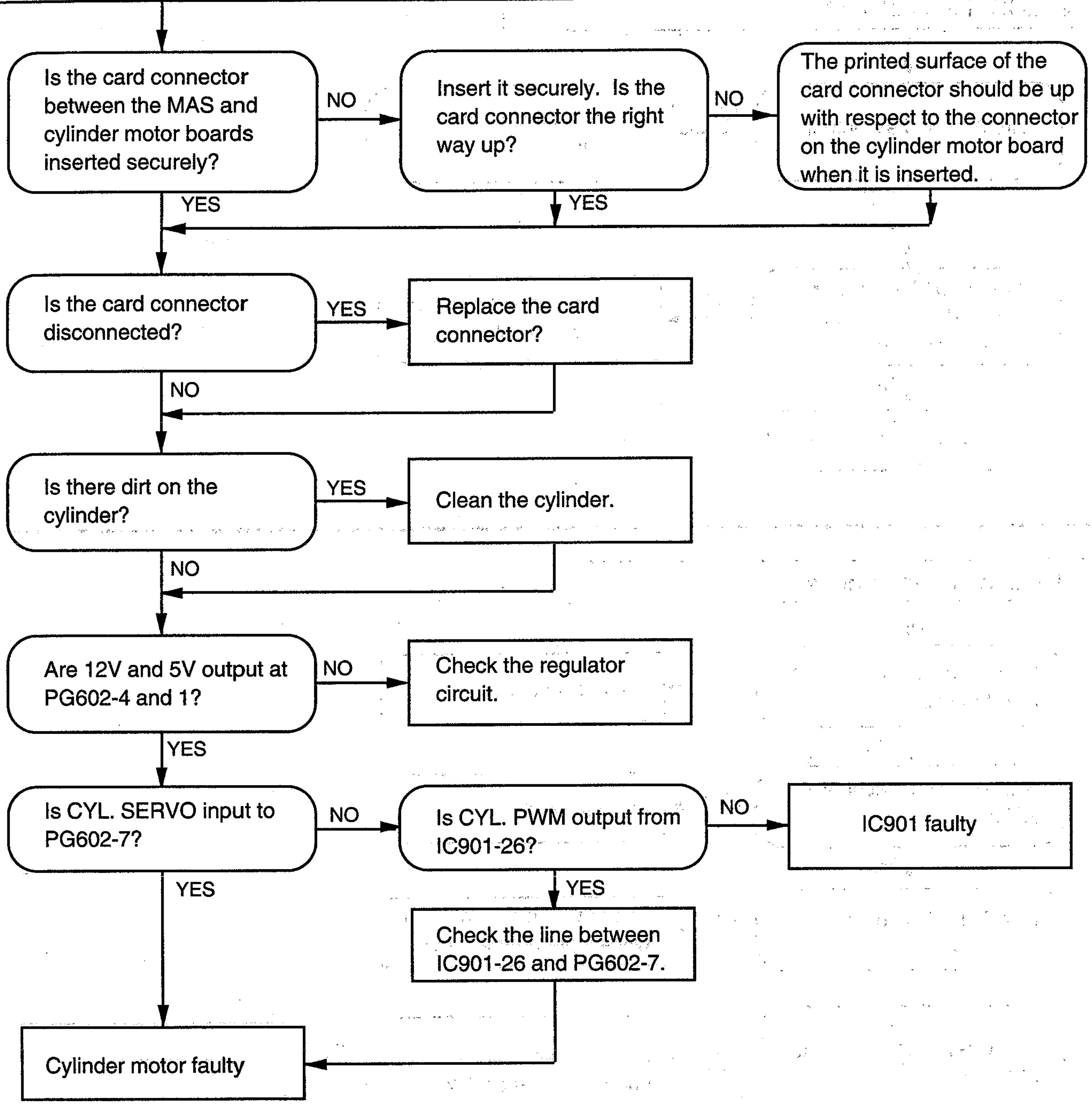
2. LCD does not light


Are A5V and 9V output?
NO
Check the switching regulator.
YES
Are the DATA, CLOCK, and LOAD signals output from the main uP?
YES
If adjacent patterns touch, correct the soldering.
NO
Replace IC1701.

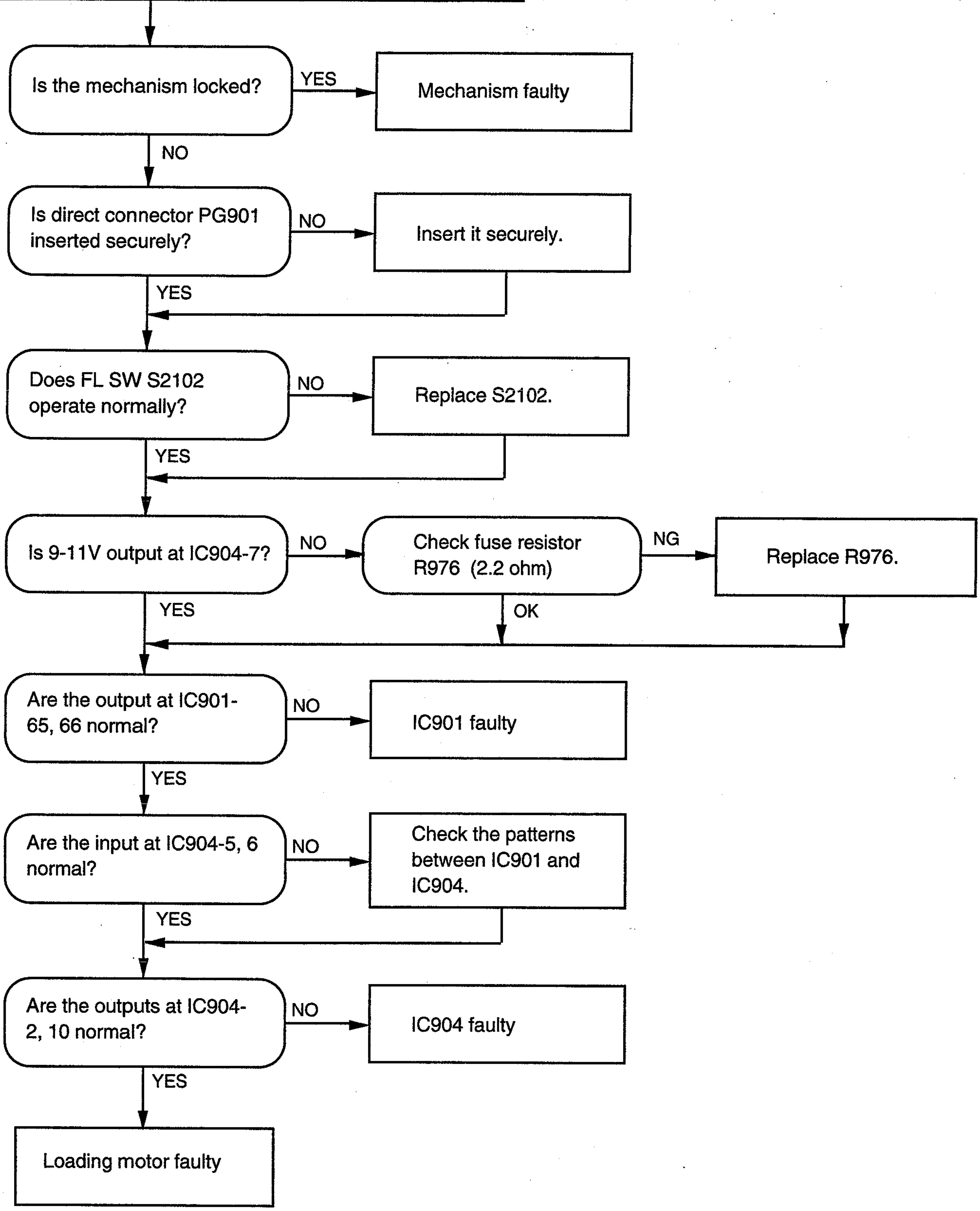
3. Capstan motor does not turn


Is direct connector PG601 inserted securely?
NO
Insert it securely.
YES
Is the loading mechanism locked?
YES
Mechanism faulty
NO
Is V.CAPST output at IC901-94?
NO
Check the REG circuit and Q864's peripheral circuits.
YES
Is CAPST.PWM output at IC901-25?
YES
Is the correct voltage present at PG601-1 ?
YES
Capstan motor faulty
NO
Check R605, C605 and the pattern.
NO
Turn the capstan motor with your hand. Is C.FG input to IC901-40?
NO
Capstan motor faulty
YES
IC901 faulty

4. Cylinder motor does not turn

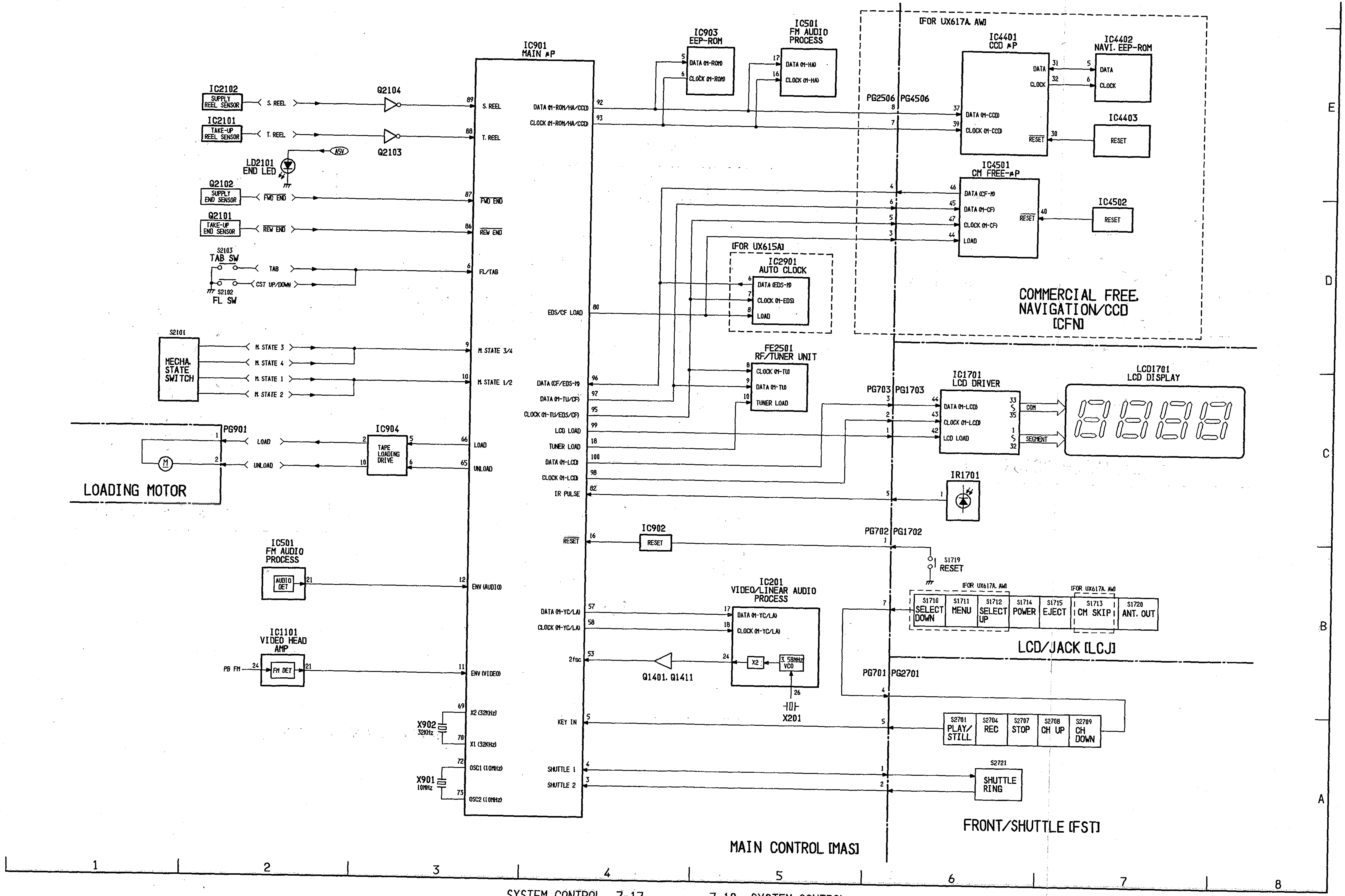

Is the card connector between the MAS and cylinder motor boards inserted securely?
NO
Insert it securely. Is the card connector the right way up?
NO
The printed surface of the card connector should be up with respect to the connector on the cylinder motor board when it is inserted.
YES
YES
Is the card connector disconnected?
YES
Replace the card connector?
NO
Is there dirt on the cylinder?
YES
Clean the cylinder.
NO
Are 12V and 5V output at PG602-4 and 1?
NO
Check the regulator circuit.
YES
Is CYL. SERVO input to PG602-7?
NO
Is CYL. PWM output from IC901-26?
NO
IC901 faulty
YES
Check the line between IC901-26 and PG602-7.
YES
Cylinder motor faulty

5. Loading motor does not turn

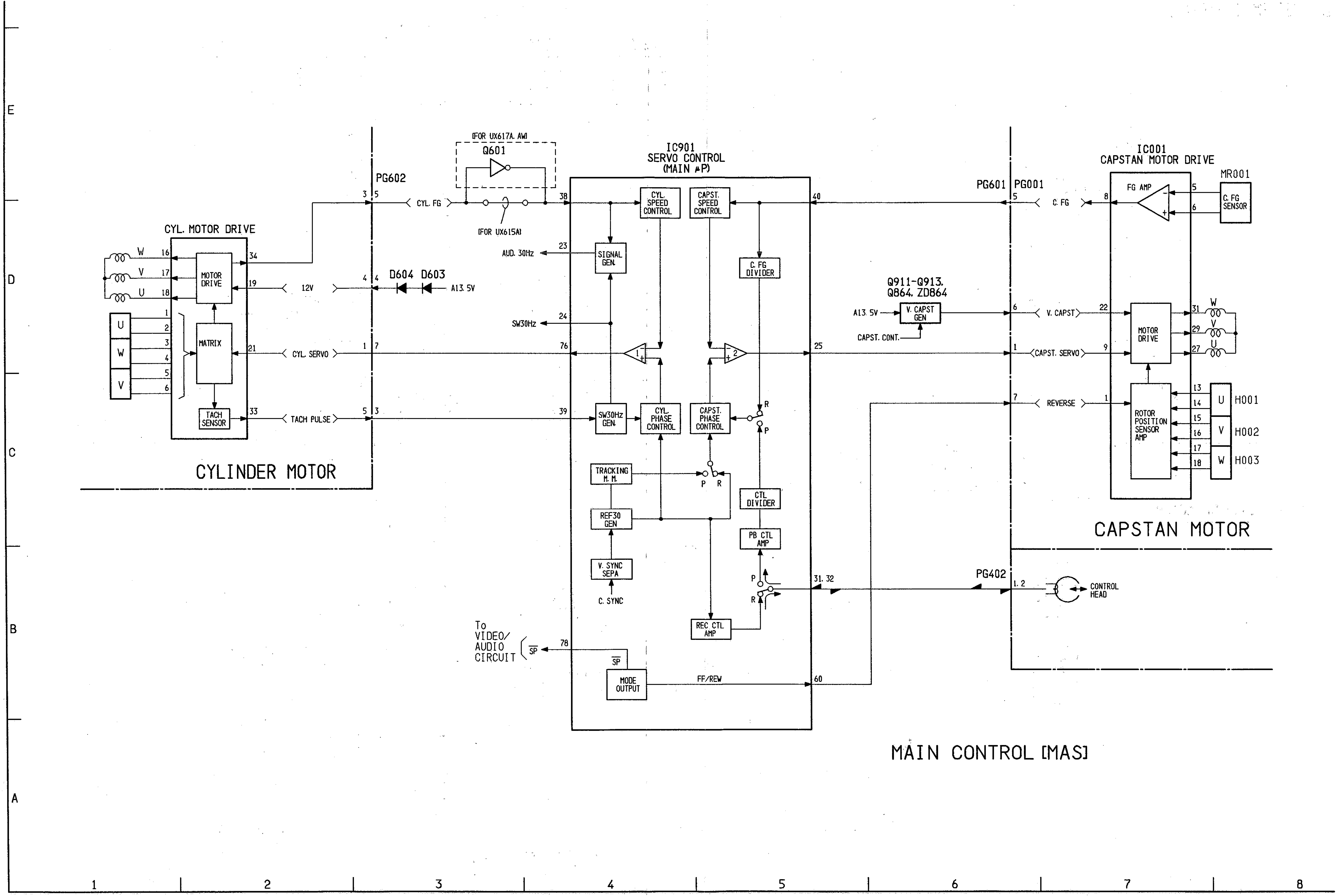

Is the mechanism locked?
YES
Mechanism faulty
NO
Is direct connector PG901 inserted securely?
NO
Insert it securely.
YES
Does FL SW S2102 operate normally?
NO
Replace S2102.
YES
Is 9-11V output at IC904-7?
NO
Check fuse resistor R976 (2.2 ohm)
NG
Replace R976.
OK
YES
Are the output at IC901-65, 66 normal?
NO
IC901 faulty
YES
Are the input at IC904-5, 6 normal?
NO
Check the patterns between IC901 and IC904.
YES
Are the outputs at IC904-2, 10 normal?
NO
IC904 faulty
YES
Loading motor faulty

MEMO

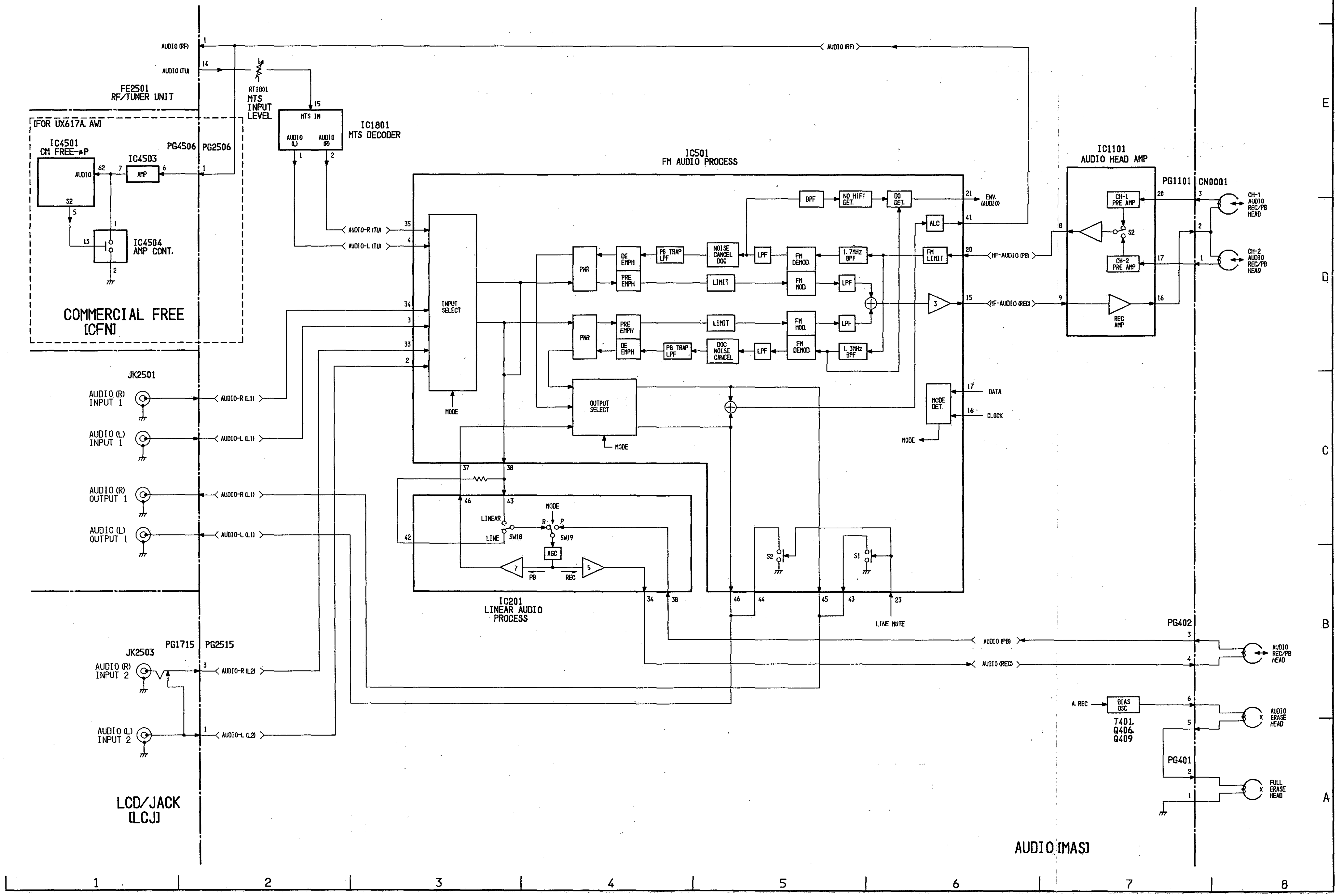
BLOCK DIAGRAMS
1. SYSTEM CONTROL


IC901
MAIN µP
IC2102
SUPPLY REEL SENSOR
IC2101
TAKE-UP REEL SENSOR
S. REEL
T. REEL
Q2104
Q2103
LD2101
END LED
A5V
Q2102
SUPPLY END SENSOR
Q2101
TAKE-UP END SENSOR
FWD END
REW END
S2103
TAB SW
TAB
CST UP/DOWN
S2102
FL SW
FL/TAB
S2101
MECHA. STATE SWITCH
M. STATE 3
M. STATE 4
M. STATE 1
M. STATE 2
M. STATE 3/4
M. STATE 1/2
PG901
LOAD
UNLOAD
LOADING MOTOR
M
IC904
TAPE LOADING DRIVE
IC501
FM AUDIO PROCESS
AUDIO DET
ENV (AUDIO)
IC1101
VIDEO HEAD AMP
PB FM
FM DET
ENV (VIDEO)
X902
32KHz
X2 (32KHz)
X1 (32KHz)
X901
10MHz
OSC1 (10MHz)
OSC2 (10MHz)
DATA (M-ROM/HA/CCD)
CLOCK (M-ROM/HA/CCD)
EDS/CF LOAD
DATA (CF/EDS-M)
DATA (M-TU/CF)
CLOCK (M-TU/EDS/CF)
LCD LOAD
TUNER LOAD
DATA (M-LCD)
CLOCK (M-LCD)
IR PULSE
RESET
DATA (M-YC/LA)
CLOCK (M-YC/LA)
2fsc
KEY IN
SHUTTLE 1
SHUTTLE 2
IC903
EEP-ROM
DATA (M-ROM)
CLOCK (M-ROM)
IC501
FM AUDIO PROCESS
DATA (M-HA)
CLOCK (M-HA)
[FOR UX617A, AW]
IC4401
CCD µP
DATA
CLOCK
DATA (M-CCD)
CLOCK (M-CCD)
RESET
IC4402
NAVI. EEP-ROM
IC4403
RESET
PG2506
PG4506
IC4501
CM FREE-µP
DATA (CF-M)
DATA (M-CF)
CLOCK (M-CF)
LOAD
IC4502
RESET
COMMERCIAL FREE NAVIGATION/CCD [CFN]
[FOR UX615A]
IC2901
AUTO CLOCK
DATA (EDS-M)
CLOCK (M-EDS)
LOAD
FE2501
RF/TUNER UNIT
CLOCK (M-TU)
DATA (M-TU)
TUNER LOAD
PG703
PG1703
IC1701
LCD DRIVER
DATA (M-LCD)
CLOCK (M-LCD)
LCD LOAD
COM
SEGMENT
LCD1701
LCD DISPLAY
IR1701
IC902
RESET
PG702
PG1702
S1719
RESET
[FOR UX617A, AW]
S1710 SELECT DOWN
S1711 MENU
S1712 SELECT UP
S1714 POWER
S1715 EJECT
S1713 CM SKIP
S1720 ANT. OUT
LCD/JACK [LCJ]
IC201
VIDEO/LINEAR AUDIO PROCESS
DATA (M-YC/LA)
CLOCK (M-YC/LA)
X2
3.58MHz VCO
Q1401, Q1411
X201
PG701
PG2701
S2701 PLAY/STILL
S2704 REC
S2707 STOP
S2708 CH UP
S2709 CH DOWN
S2721
SHUTTLE RING
FRONT/SHUTTLE [FST]
MAIN CONTROL [MAS]
1
2
3
4
5
6
7
8
A
B
C
D
E

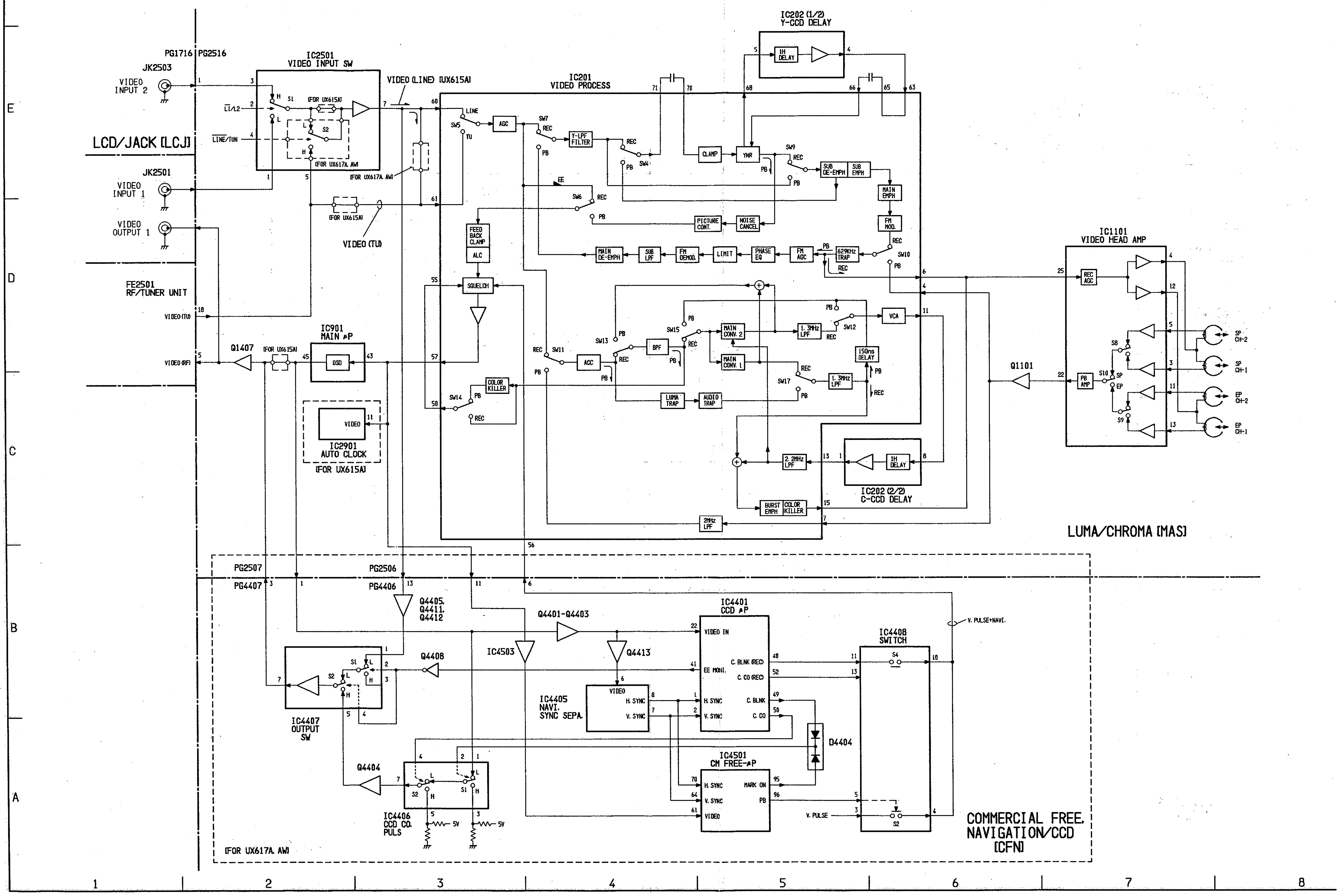
2. SERVO


E
D
C
B
A
1
2
3
4
5
6
7
8
CYL. MOTOR DRIVE
W
V
U
16
17
18
MOTOR DRIVE
34
19
1
2
3
4
5
6
U
W
V
MATRIX
21
TACH SENSOR
33
CYLINDER MOTOR
PG602
3 5
CYL. FG
4 4
12V
D604 D603
A13. 5V
1 7
CYL. SERVO
5 3
TACH PULSE
[FOR UX617A. AW]
Q601
[FOR UX615A]
IC901
SERVO CONTROL
(MAIN µP)
38
CYL. SPEED CONTROL
CAPST. SPEED CONTROL
40
23
AUD. 30Hz
SIGNAL GEN.
C. FG DIVIDER
24
SW30Hz
76
1
2
25
39
SW30Hz GEN.
CYL. PHASE CONTROL
CAPST. PHASE CONTROL
R
P
TRACKING M. M.
P R
REF30 GEN
CTL DIVIDER
PB CTL AMP
V. SYNC SEPA
C. SYNC
P
R
31. 32
REC CTL AMP
To VIDEO/ AUDIO CIRCUIT
SP
78
SP
MODE OUTPUT
FF/REW
60
PG601 PG001
5
C. FG
Q911-Q913. Q864. ZD864
A13. 5V
V. CAPST GEN
CAPST. CONT.
6
V. CAPST
1
CAPST. SERVO
7
REVERSE
PG402
1. 2
CONTROL HEAD
IC001
CAPSTAN MOTOR DRIVE
FG AMP
8
5
6
MR001
C. FG SENSOR
22
MOTOR DRIVE
31
29
27
W
V
U
9
1
ROTOR POSITION SENSOR AMP
13
14
15
16
17
18
U
V
W
H001
H002
H003
CAPSTAN MOTOR
MAIN CONTROL [MAS]

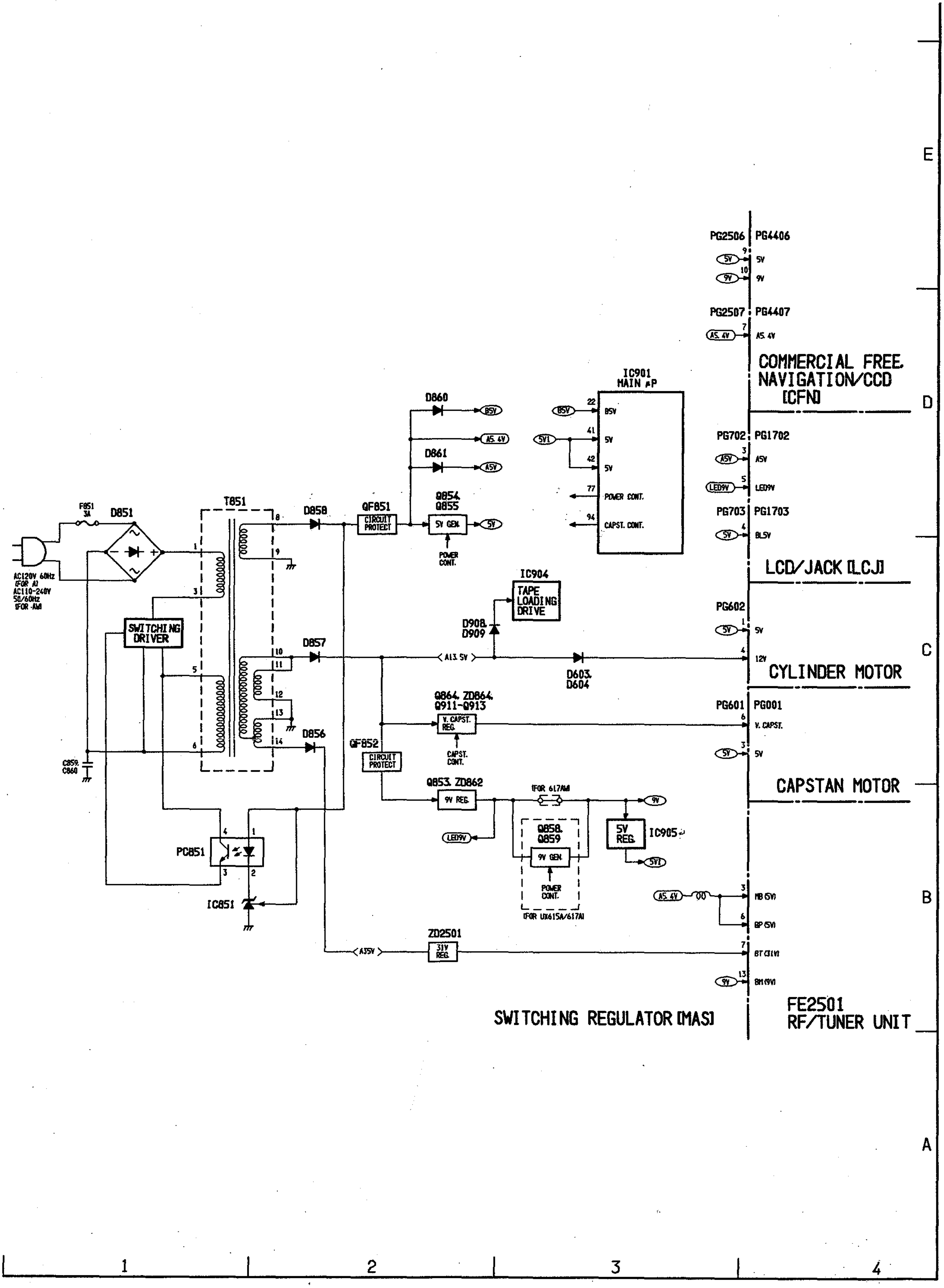
3. AUDIO


AUDIO (RF)
AUDIO (TU)
FE2501
RF/TUNER UNIT
RT1801
MTS
INPUT
LEVEL
MTS IN
AUDIO (L)
AUDIO (R)
IC1801
MTS DECODER
[FOR UX617A, AW]
IC4501
CM FREE-μP
IC4503
AMP
PG4506
PG2506
IC4504
AMP CONT.
COMMERCIAL FREE
[CFN]
IC501
FM AUDIO PROCESS
INPUT SELECT
MODE
PNR
DE EMPH
PRE EMPH
PB TRAP LPF
NOISE CANCEL DOC
DOC NOISE CANCEL
LIMIT
LPF
FM DEMOD.
FM MOD.
1.7MHz BPF
1.3MHz BPF
BPF
NO HiFi DET.
DO DET.
ALC
FM LIMIT
ENV. (AUDIO)
AUDIO (RF)
AUDIO-R (TU)
AUDIO-L (TU)
OUTPUT SELECT
MODE DET.
DATA
CLOCK
HF-AUDIO (PB)
HF-AUDIO (REC)
IC1101
AUDIO HEAD AMP
CH-1 PRE AMP
CH-2 PRE AMP
REC AMP
S2
PG1101
CN0001
CH-1 AUDIO REC/PB HEAD
CH-2 AUDIO REC/PB HEAD
JK2501
AUDIO (R) INPUT 1
AUDIO (L) INPUT 1
AUDIO (R) OUTPUT 1
AUDIO (L) OUTPUT 1
AUDIO-R (L1)
AUDIO-L (L1)
IC201
LINEAR AUDIO
PROCESS
LINEAR
LINE
SW18
SW19
R
P
AGC
PB
REC
S1
S2
LINE MUTE
PG402
AUDIO (PB)
AUDIO (REC)
AUDIO REC/PB HEAD
A. REC
BIAS OSC
T401,
Q406,
Q409
AUDIO ERASE HEAD
PG401
FULL ERASE HEAD
JK2503
PG1715
PG2515
AUDIO (R) INPUT 2
AUDIO (L) INPUT 2
AUDIO-R (L2)
AUDIO-L (L2)
LCD/JACK
[LCJ]
AUDIO [MAS]
E
D
C
B
A
1
2
3
4
5
6
7
8

4. VIDEO


E
D
C
B
A
1
2
3
4
5
6
7
8
LCD/JACK [LCJ]
PG1716
PG2516
JK2503
VIDEO INPUT 2
JK2501
VIDEO INPUT 1
VIDEO OUTPUT 1
FE2501 RF/TUNER UNIT
VIDEO (TU)
VIDEO (RF)
IC2501 VIDEO INPUT SW
L1/L2
LINE/TUN
S1
S2
[FOR UX615A]
[FOR UX617A, AW]
VIDEO (LINE) [UX615A]
VIDEO (TU)
Q1407
IC901 MAIN µP
OSD
IC2901 AUTO CLOCK
[FOR UX615A]
IC201 VIDEO PROCESS
LINE
TU
SW5
AGC
SW7
Y-LPF FILTER
REC
PB
SW4
CLAMP
YNR
SW9
SUB DE-EMPH
SUB EMPH
MAIN EMPH
FM MOD.
EE
SW6
PICTURE CONT.
NOISE CANCEL
FEED BACK CLAMP
ALC
MAIN DE-EMPH
SUB LPF
FM DEMOD.
LIMIT
PHASE EQ
FM AGC
629KHz TRAP
SW10
SQUELCH
SW11
SW13
ACC
SW15
BPF
MAIN CONV. 2
MAIN CONV. 1
1.3MHz LPF
SW12
VCA
150ns DELAY
SW17
SW14
COLOR KILLER
LUMA TRAP
AUDIO TRAP
2.2MHz LPF
BURST EMPH
COLOR KILLER
2MHz LPF
IC202 (1/2) Y-CCD DELAY
1H DELAY
IC202 (2/2) C-CCD DELAY
IC1101 VIDEO HEAD AMP
REC AGC
PB AMP
S8
S9
S10
SP
EP
SP CH-2
SP CH-1
EP CH-2
EP CH-1
Q1101
LUMA/CHROMA [MAS]
PG2507
PG4407
PG2506
PG4406
Q4405, Q4411, Q4412
Q4401-Q4403
IC4503
Q4413
Q4408
Q4404
IC4407 OUTPUT SW
IC4406 CCD CO. PULS
5V
IC4405 NAVI. SYNC SEPA.
VIDEO
H. SYNC
V. SYNC
IC4401 CCD µP
VIDEO IN
EE MONI.
C. BLNK (REC)
C. CO (REC)
C. BLNK
C. CO
IC4501 CM FREE-µP
MARK ON
PB
D4404
IC4408 SWITCH
S4
V. PULSE
V. PULSE+NAVI.
[FOR UX617A, AW]
COMMERCIAL FREE, NAVIGATION/CCD [CFN]

5. REGULATOR


F851 3A
D851
AC120V 60Hz (FOR A)
AC110-240V 50/60Hz (FOR -AM)
T851
SWITCHING DRIVER
C859, C860
PC851
IC851
D858
QF851
CIRCUIT PROTECT
D860
B5V
A5.4V
D861
A5V
Q854, Q855
5V GEN.
5V
POWER CONT.
D857
A13.5V
D908, D909
IC904
TAPE LOADING DRIVE
D603, D604
D856
QF852
CIRCUIT PROTECT
Q864, ZD864, Q911-Q913
V. CAPST. REG.
CAPST. CONT.
Q853, ZD862
9V REG.
LED9V
(FOR 617AM)
9V
Q858, Q859
9V GEN.
POWER CONT.
(FOR UX615A/617A)
5V REG.
IC905
5V1
A35V
ZD2501
31V REG.
IC901
MAIN µP
B5V
5V
POWER CONT.
CAPST. CONT.
PG2506
PG4406
9V
PG2507
PG4407
A5.4V
COMMERCIAL FREE NAVIGATION/CCD [CFN]
PG702
PG1702
A5V
LED9V
PG703
PG1703
BL5V
LCD/JACK [LCJ]
PG602
12V
CYLINDER MOTOR
PG601
PG001
V. CAPST.
CAPSTAN MOTOR
MB (5V)
BP (5V)
BT (31V)
BH (9V)
SWITCHING REGULATOR [MAS]
FE2501 RF/TUNER UNIT
E
D
C
B
A
1
2
3
4

HITACHI

SERVICE MANUAL

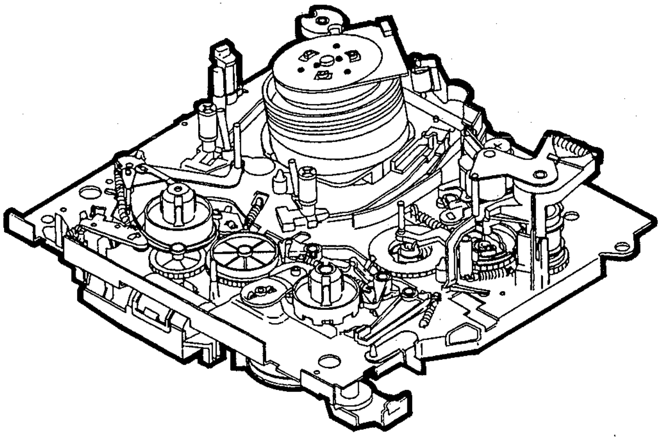
TK

No.4527E

US Mechanism

This service manual includes the procedures to dismantle, adjust and maintain the US mechanism. Use this together with the manual of each VCR model.

VIDE-V17007



VHS

S VHS

Please read this service manual thoroughly before servicing. Be sure to observe the cautions described in this manual so the safety of the product can be maintained.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

April 1996 Image & Information Media Systems Division, Tokai

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CHAPTER 1 GENERAL INFORMATION

Appearances of US Mechanism

1. Top View of US Mechanism (I)

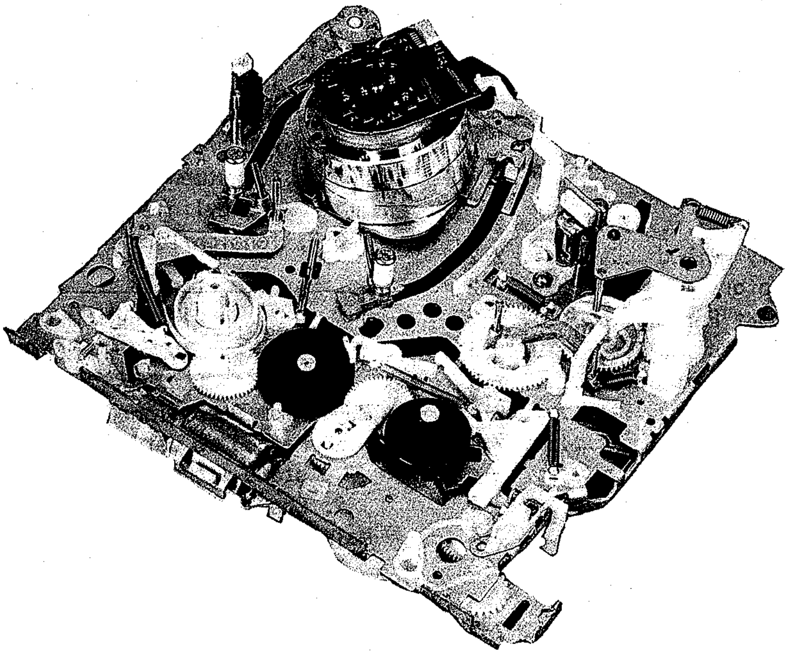


Fig. 1-1

2. Top View of US Mechanism (II)

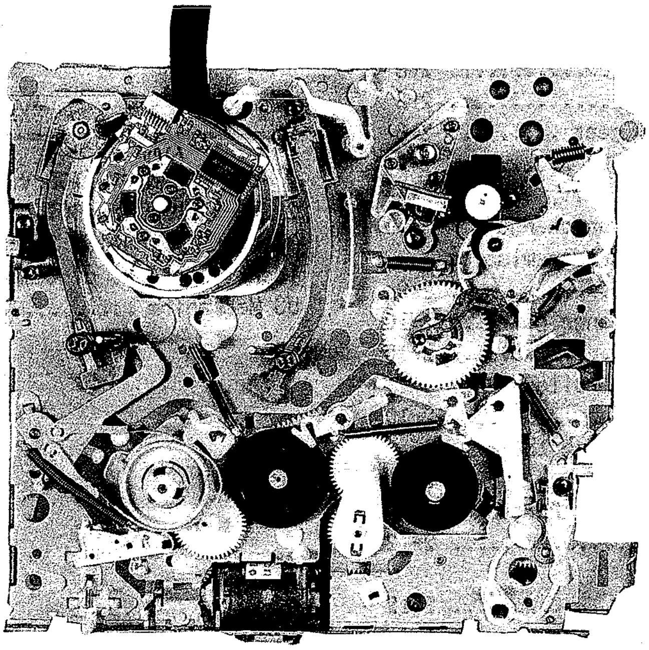


Fig. 1-2

3. Bottom View of US Mechanism (I)

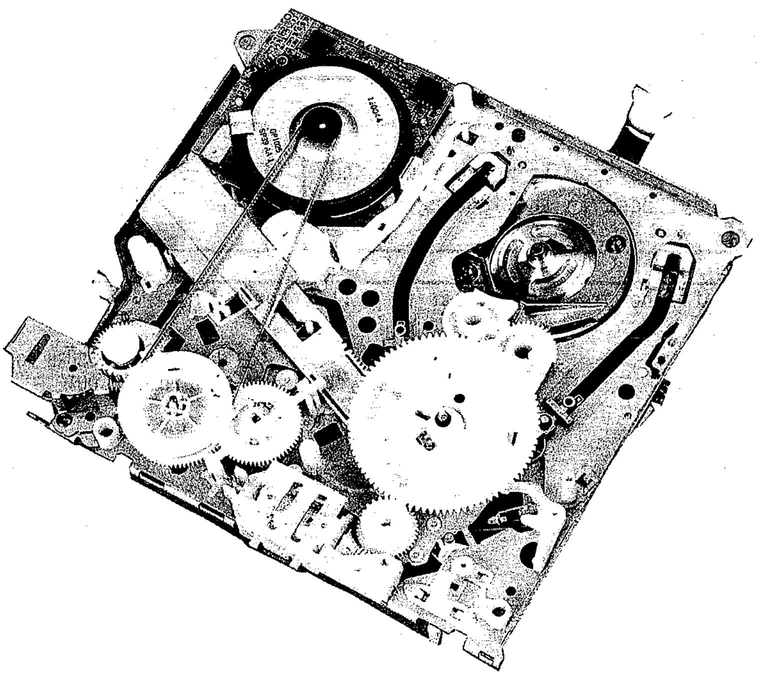


Fig. 1-3

4. Bottom View of US Mechanism (II)

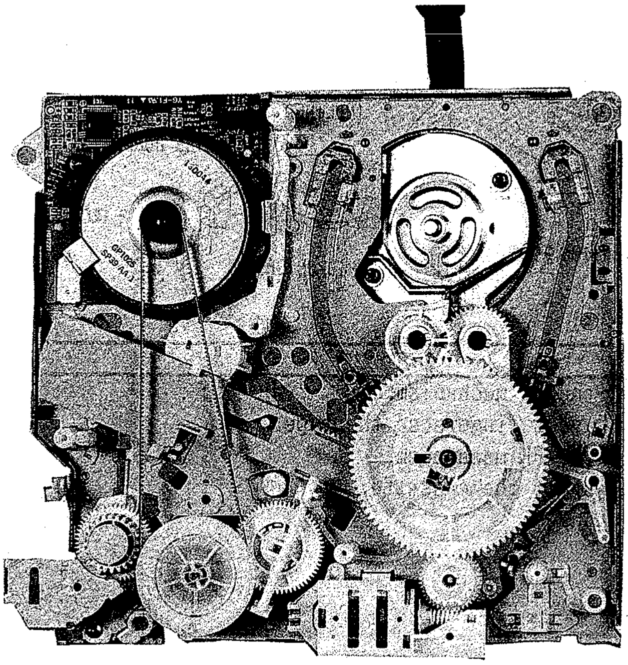


Fig. 1-4

How to Remove the Cassette when a Malfunction Has Occurred in the Mechanism

If a cassette is caught in the mechanism because of a malfunction in the mechanism, remove it by the following procedure.

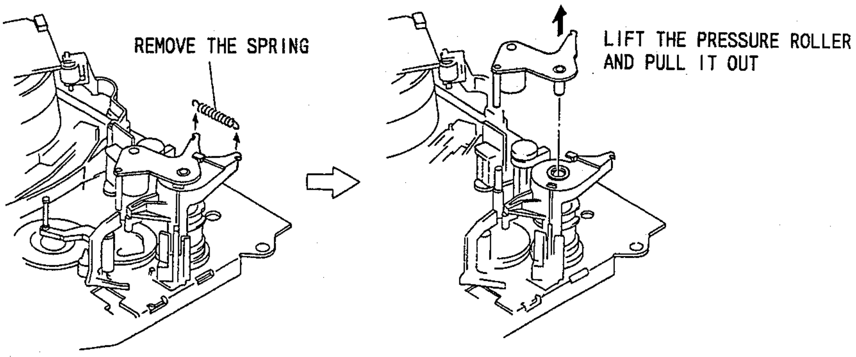
[Work Procedure]

1. Remove the top cover.
2. Remove the front panel.

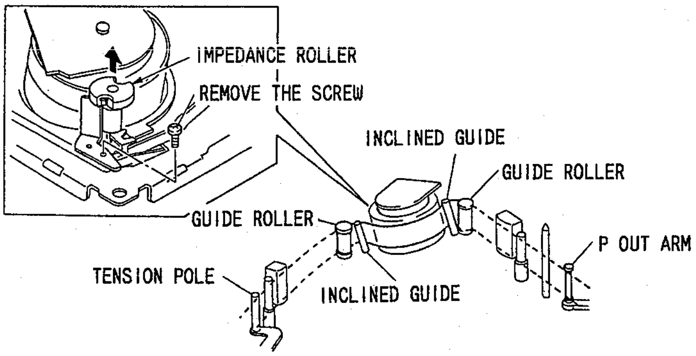
If the tape is wound round the cylinder in the loading state

If the cassette does not come out from the FL mechanism in the unloading state.

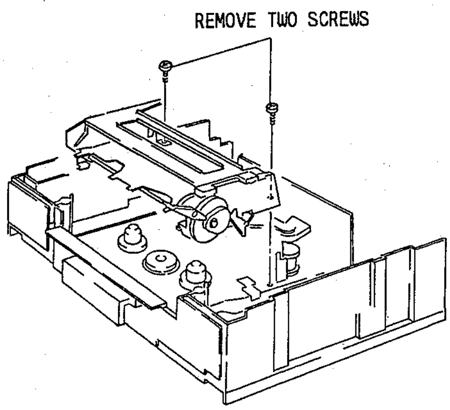
Remove the spring and lift the pressure roller to pull it out.


REMOVE THE SPRING
LIFT THE PRESSURE ROLLER AND PULL IT OUT

1) Remove the screw and lift the impedance roller together with the impedance plate.
2) Slacken the tape and release it from the tension pole, guide rollers, inclined guides and P out arm.


IMPEDANCE ROLLER
REMOVE THE SCREW
INCLINED GUIDE
GUIDE ROLLER
GUIDE ROLLER
P OUT ARM
TENSION POLE
INCLINED GUIDE

1) Remove two screws holding the FL mechanism.
2) Hold the cassette lid with your fingers so the tape is not damaged and remove the FL mechanism.
3) Remove the slack tape and eject the cassette.


REMOVE TWO SCREWS

CHAPTER 2 DISASSEMBLY

1. Before Starting Disassembly

1) Unplug the power cord from the AC outlet.
2) [Removal procedure]
If a special procedure is required when dismantling any component, it is indicated using numbers. Follow the numbers (①, ②, ③ ...) shown in the illustrations.

[Reinstallation procedure]
Reinstall each component in the reverse order to removal when otherwise not specified.

2. Identifications and Locations of Components of US Mechanism

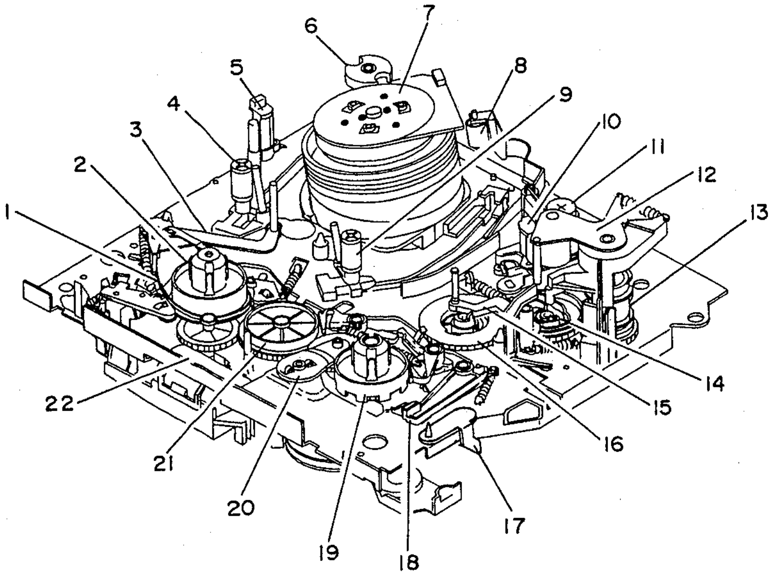


Fig. 2-1 Top View of US Mechanism

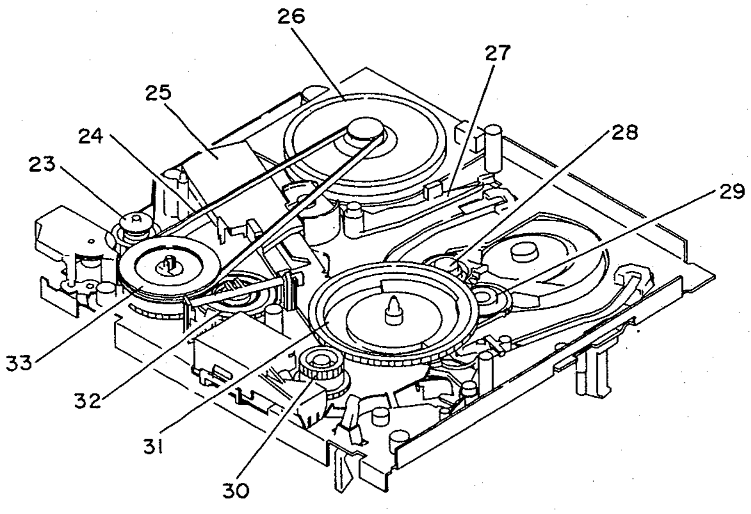


Fig. 2-2 Bottom View of US Mechanism

1. Tension band
2. Supply reel disk
3. Tension arm
4. Supply guide roller
5. Full erase (FE) head
6. Impedance roller
7. Cylinder motor
8. HC mechanism
9. Take-up guide roller
10. Audio/control (A/C) head
11. Capstan shaft
12. Pressure roller arm
13. Spiral gear
14. PR idler gear
15. P. out arm
16. P. drive gear
17. S-VHS switch (S-VHS VCR only)
18. Take-up brake
19. Take-up reel disk
20. FR arm
21. Idler gear 2
22. Loading motor
23. FL change gear
24. Drive belt
25. Slider
26. Capstan motor
27. FS brake
28. Loading gear (R)
29. Loading gear (L)
30. LM wheel gear
31. Cam gear
32. Torque change gear
33. Pulley assembly

3. US Mechanism Disassembly Method

When replacing defective parts, first refer to the "parts hierarchy chart" shown below. This chart shows the procedure for parts removal when replacing defective parts.

[How to use the parts hierarchy chart]
(1) Locate the part to be replaced.
(2) Check the parts in the ranks above the part to be replaced and start dismantling.
(3) Replace the defective part and reinstall the parts in the reverse order to that shown in the parts hierarchy chart.

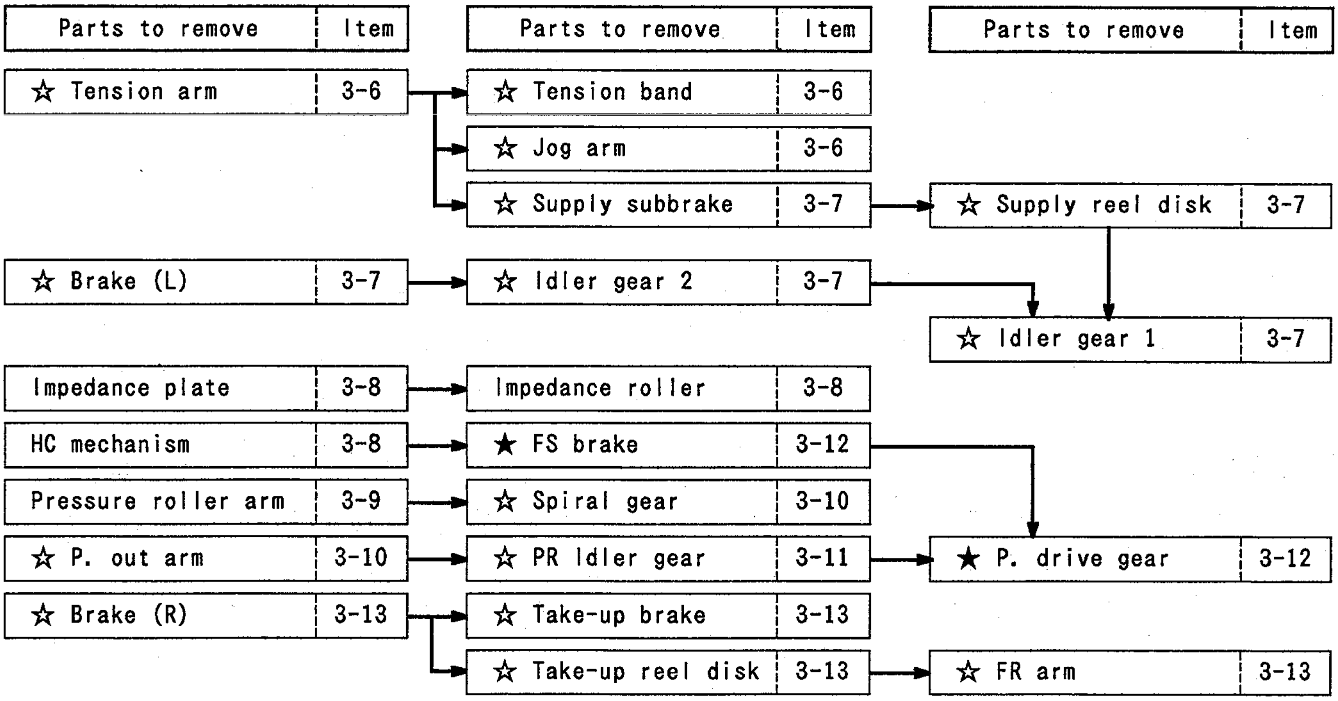
Removal of Heads and Motors

Note: Dismantle parts in the eject state.

Parts to remove	Item
FE head	3-1
A/C head	3-2
★ Cylinder motor	3-3
★ Capstan motor	3-4
★ Loading motor	3-5

Removal of Tape Transport Parts

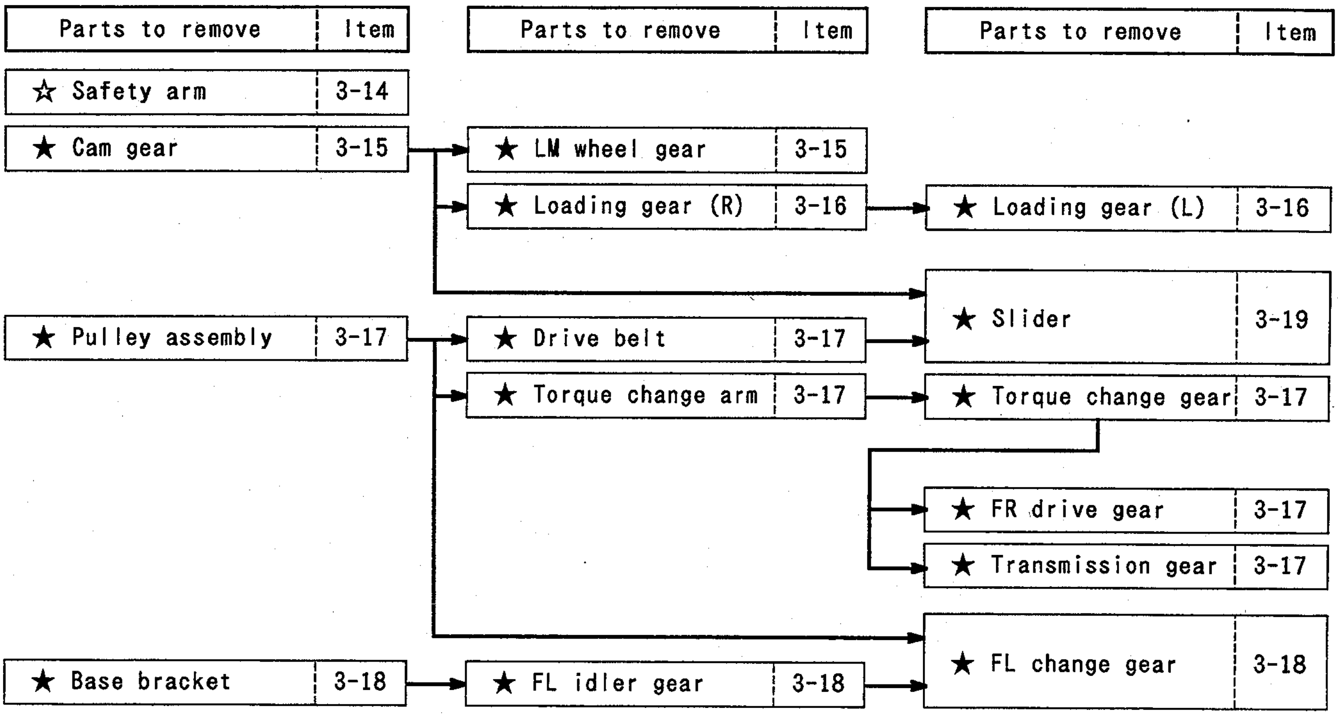
Note: Dismantle parts in the eject state.


Parts to remove | Item
Parts to remove | Item
Parts to remove | Item
☆ Tension arm | 3-6
☆ Tension band | 3-6
☆ Jog arm | 3-6
☆ Supply subbrake | 3-7
☆ Supply reel disk | 3-7
☆ Brake (L) | 3-7
☆ Idler gear 2 | 3-7
☆ Idler gear 1 | 3-7
Impedance plate | 3-8
Impedance roller | 3-8
HC mechanism | 3-8
★ FS brake | 3-12
Pressure roller arm | 3-9
☆ Spiral gear | 3-10
☆ P. out arm | 3-10
☆ PR Idler gear | 3-11
★ P. drive gear | 3-12
☆ Brake (R) | 3-13
☆ Take-up brake | 3-13
☆ Take-up reel disk | 3-13
☆ FR arm | 3-13

◆ How to interpret the symbols
- Dismantle the parts marked ☆ after the FL mechanism has been removed.
- Dismantle the parts marked ★ after the US mechanism has been removed from the VCR.
- The parts without any marks can be replaced with the top cover removed.

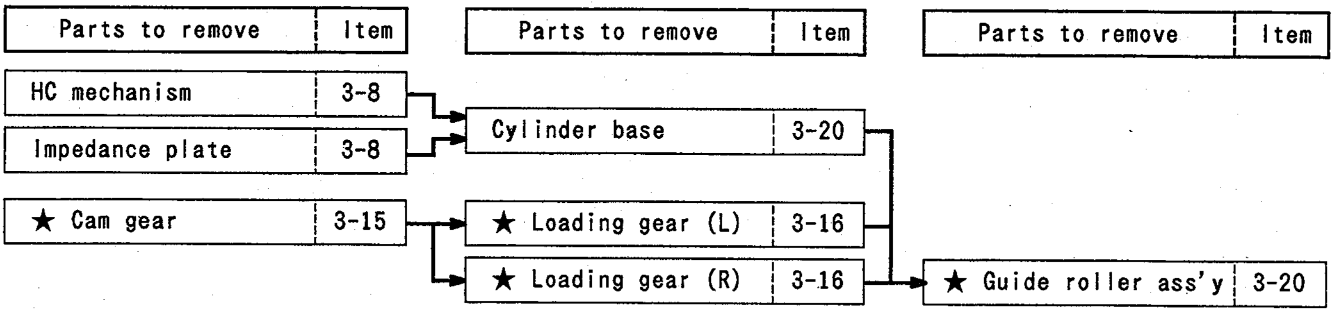
Removal of Tape Drive Parts

Note: Dismantle parts in the eject state.


Parts to remove
Item
Parts to remove
Item
Parts to remove
Item
☆ Safety arm
3-14
★ Cam gear
3-15
★ LM wheel gear
3-15
★ Loading gear (R)
3-16
★ Loading gear (L)
3-16
★ Slider
3-19
★ Pulley assembly
3-17
★ Drive belt
3-17
★ Torque change arm
3-17
★ Torque change gear
3-17
★ FR drive gear
3-17
★ Transmission gear
3-17
★ FL change gear
3-18
★ Base bracket
3-18
★ FL idler gear
3-18

Removal of Guide Roller Assemblies

Note: Dismantle parts in the eject state.


Parts to remove
Item
Parts to remove
Item
Parts to remove
Item
HC mechanism
3-8
Impedance plate
3-8
Cylinder base
3-20
★ Cam gear
3-15
★ Loading gear (L)
3-16
★ Loading gear (R)
3-16
★ Guide roller ass'y
3-20

◆ How to interpret the symbols

- Dismantle the parts marked ☆ after the FL mechanism has been removed.
- Dismantle the parts marked ★ after the US mechanism has been removed from the VCR.
- The parts without any marks can be replaced with the top cover removed.

3-1. FE head

◆ **Caution when reinstalling**

1) Clean the surfaces of the FE head and supply guide roller with which the tape comes into contact.

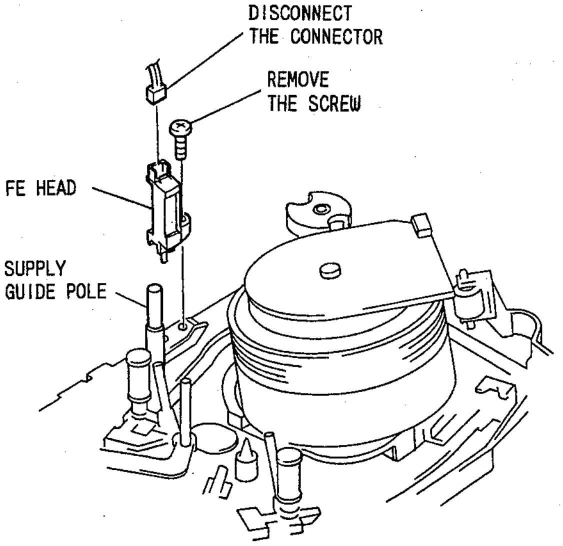

DISCONNECT THE CONNECTOR
REMOVE THE SCREW
FE HEAD
SUPPLY GUIDE POLE

Fig. 3-1

3-2. A/C head

◆ **Caution when reinstalling**

1) Clean the surface of the A/C head with which the tape comes into contact.

◆ **Mechanism adjustment after reinstalling**

1) Audio/control (A/C) head adjustment

◆ **Electrical adjustment after reinstalling**

1) X-value adjustment

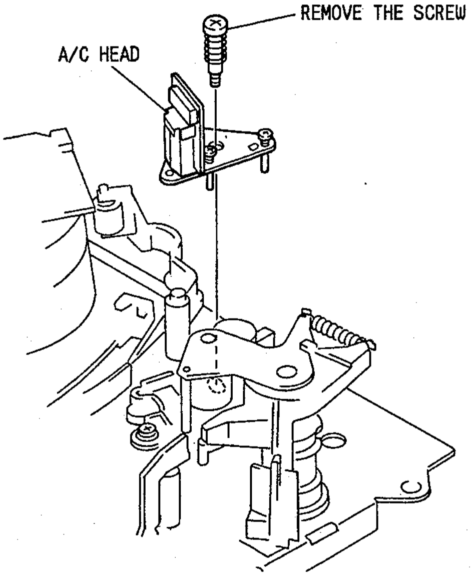

REMOVE THE SCREW
A/C HEAD

Fig. 3-2

3-3 Cylinder motor assembly

◆ **Caution during work**

1) Do not touch the video head tips.

◆ **Mechanism adjustment after reinstalling**

1) Adjustments after replacing the cylinder

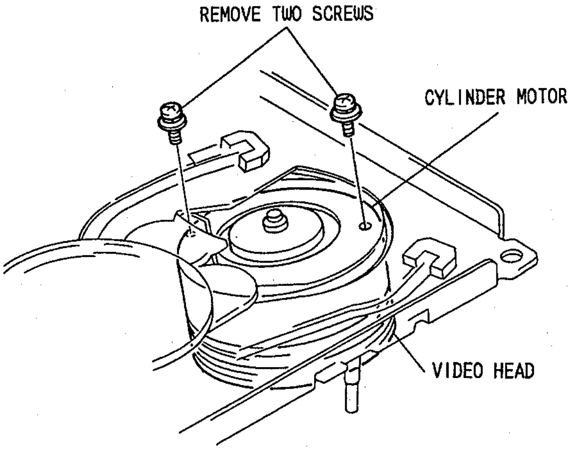

REMOVE TWO SCREWS
CYLINDER MOTOR
VIDEO HEAD

Fig. 3-3

3-4. Capstan motor

◆ **Caution when reinstalling**

1) Clean the surface of the capstan shaft with which the tape comes into contact.

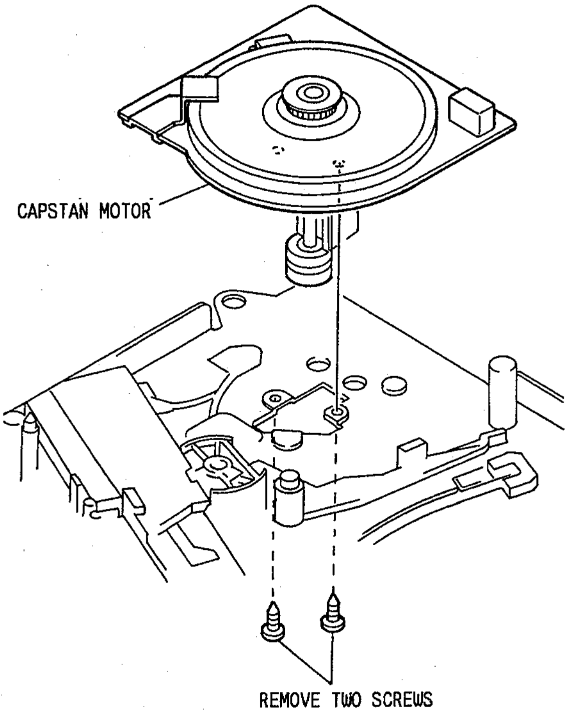

CAPSTAN MOTOR
REMOVE TWO SCREWS

Fig. 3-4

3-5. Loading motor

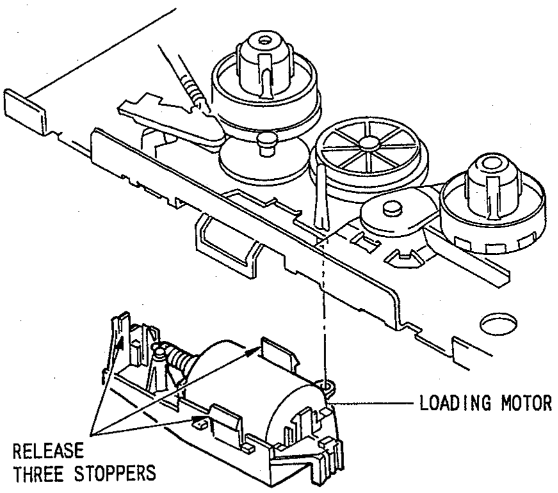

LOADING MOTOR
RELEASE
THREE STOPPERS

Fig. 3-5

3-6. Tension arm, tension band and jog arm

◆ **Caution when reinstalling**

1) Clean the surface of the tension pole with which the tape comes into contact.

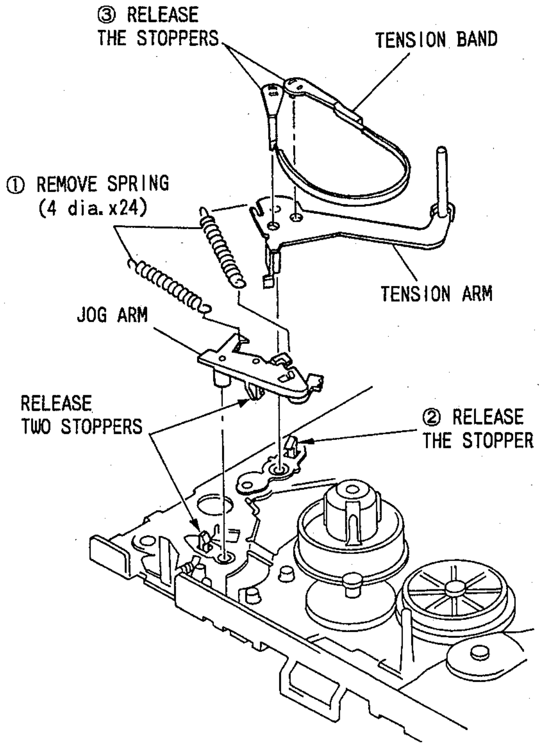

③ RELEASE
THE STOPPERS
TENSION BAND
① REMOVE SPRING
(4 dia. x24)
TENSION ARM
JOG ARM
RELEASE
TWO STOPPERS
② RELEASE
THE STOPPER

Fig. 3-6

3-7. Supply subbrake, supply reel disk, brake (L), idler gears 1 and 2

◆ **Mechanism adjustment after reinstalling**

1) Reel disk height adjustment

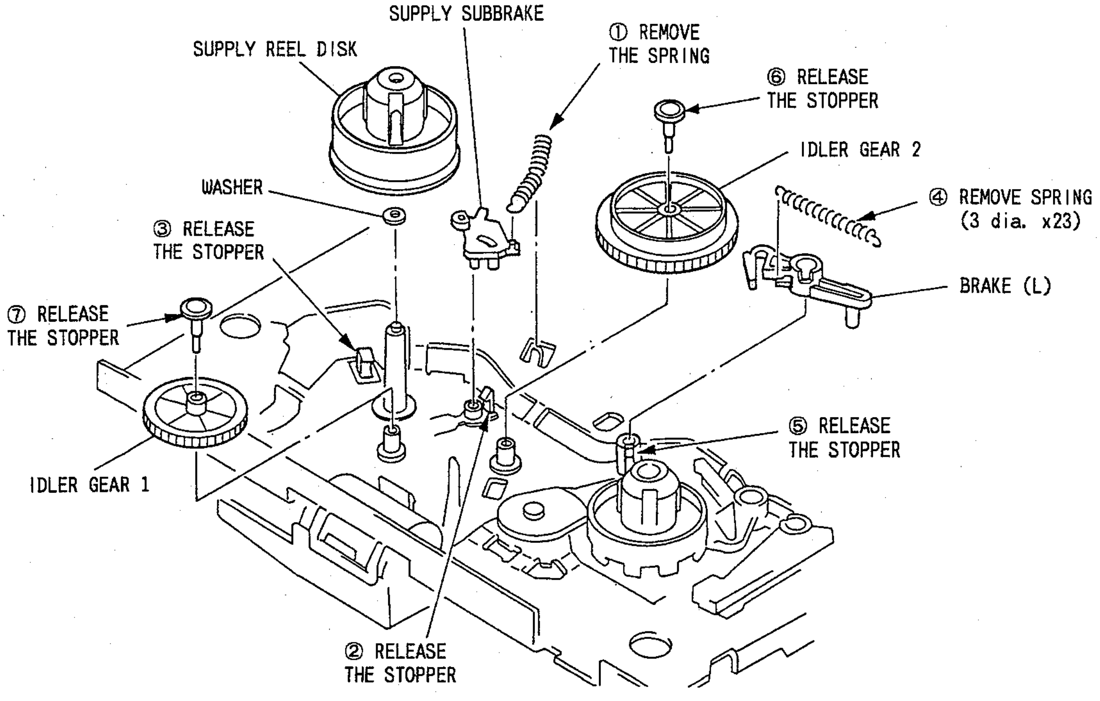

SUPPLY SUBBRAKE
SUPPLY REEL DISK
① REMOVE
THE SPRING
⑥ RELEASE
THE STOPPER
IDLER GEAR 2
WASHER
④ REMOVE SPRING
(3 dia. x23)
③ RELEASE
THE STOPPER
BRAKE (L)
⑦ RELEASE
THE STOPPER
⑤ RELEASE
THE STOPPER
IDLER GEAR 1
② RELEASE
THE STOPPER

Fig. 3-7

3-8. Impedance roller and HC mechanism

◆ Caution when reinstalling

1) Check that the HC mechanism arm is set to the specified position.

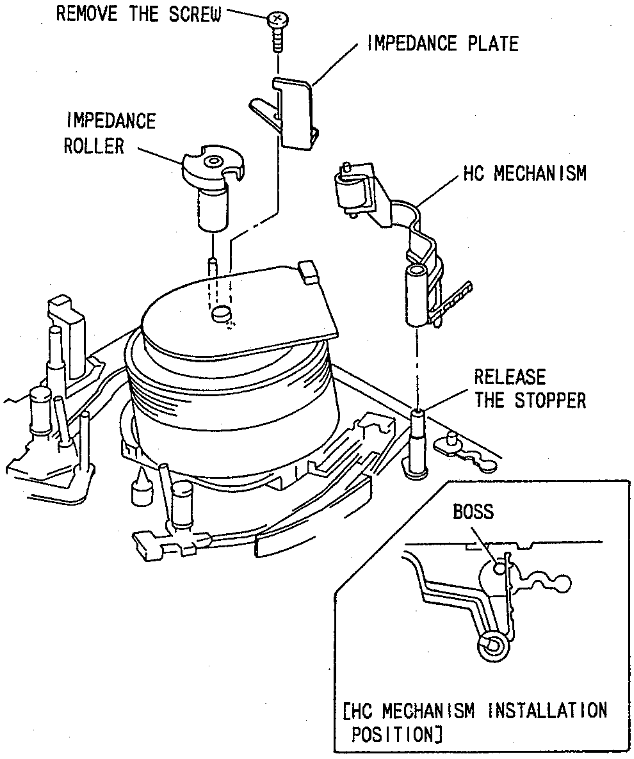

REMOVE THE SCREW
IMPEDANCE PLATE
IMPEDANCE ROLLER
HC MECHANISM
RELEASE THE STOPPER
BOSS
[HC MECHANISM INSTALLATION POSITION]

Fig. 3-8

3-9. Pressure roller arm

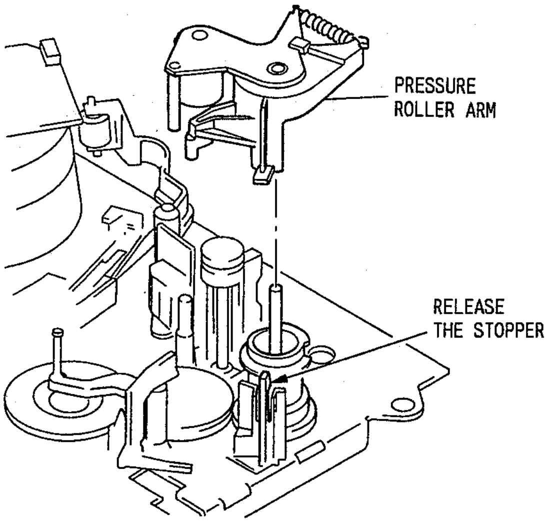

PRESSURE ROLLER ARM
RELEASE THE STOPPER

Fig. 3-9

3-10. Spiral gear and P. out arm

◆ Cautions when reinstalling

1) Align the gear positions of the spiral gear and PR idler gear.
2) Clean the surface of the P. out arm with which the tape comes into contact.
3) Check that the P. out arm is set to the specified position.
4) Turn the lid opener counterclockwise to lock it.

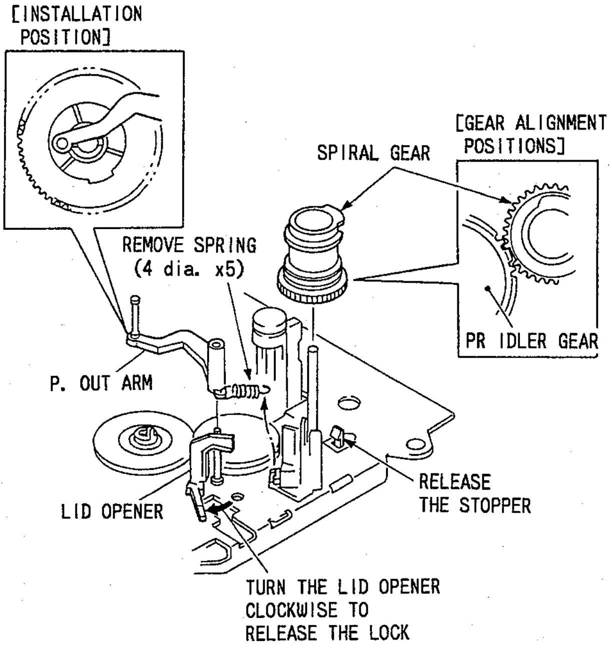

[INSTALLATION POSITION]
[GEAR ALIGNMENT POSITIONS]
SPIRAL GEAR
REMOVE SPRING (4 dia. x5)
PR IDLER GEAR
P. OUT ARM
LID OPENER
RELEASE THE STOPPER
TURN THE LID OPENER CLOCKWISE TO RELEASE THE LOCK

Fig. 3-10

3-11. PR idler gear

◆ **Caution when reinstalling**

1) Align the gear positions of the P. drive gear and PR idler gear.

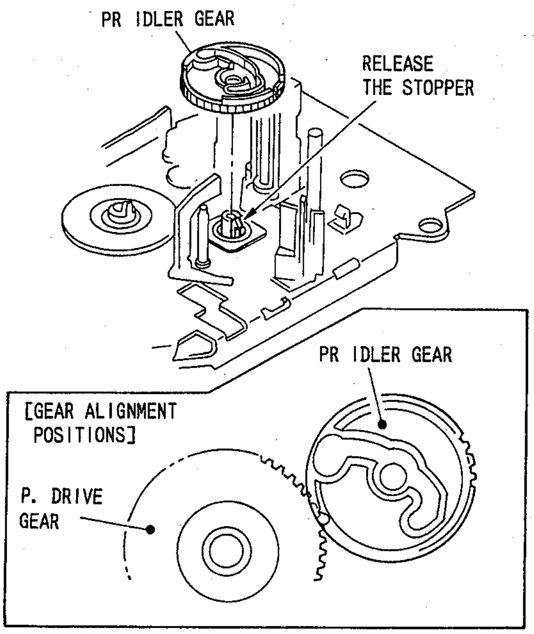

PR IDLER GEAR
RELEASE THE STOPPER
PR IDLER GEAR
[GEAR ALIGNMENT POSITIONS]
P. DRIVE GEAR

Fig. 3-11

3-12. FS brake and P. drive gear

◆ **Caution when reinstalling**

1) Align the positions of the P. drive gear and slider.

[Items to be checked around the pressure roller]

(A) Engaged section between the spiral gear and PR idler gear

(B) △ mark (No. 1) on the P. drive gear and ▽ mark on the spring hook

(C) Engaged section between the PR idler gear and P. drive gear

(D) The lid opener is locked in the specified position.

(E) Engaged section between the P. drive gear and slider

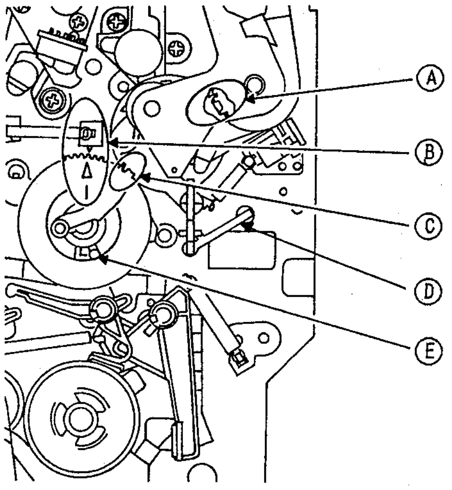
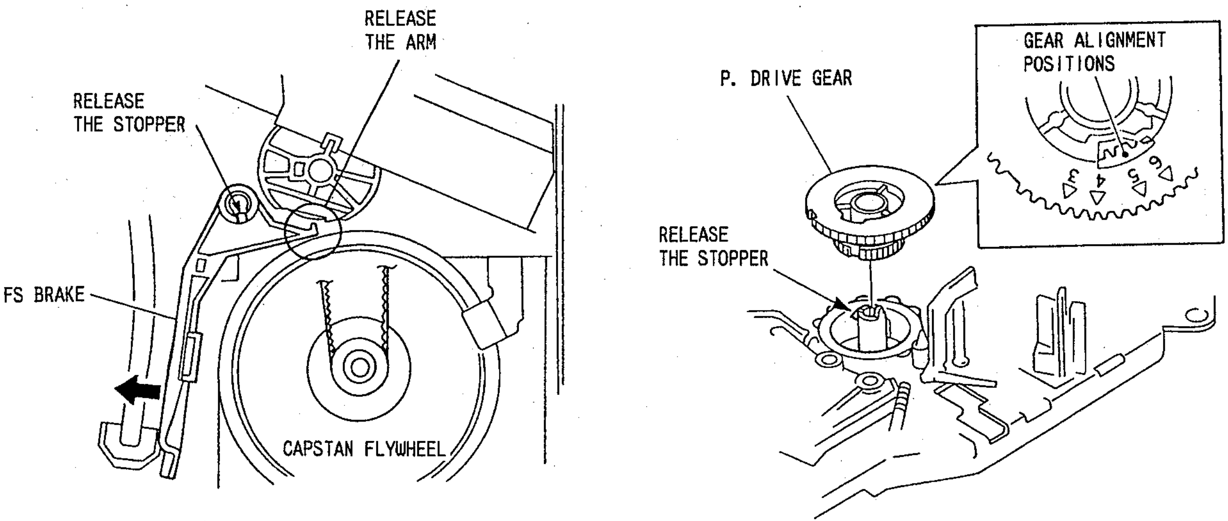


Fig. 3-12


RELEASE THE ARM
RELEASE THE STOPPER
FS BRAKE
CAPSTAN FLYWHEEL
P. DRIVE GEAR
GEAR ALIGNMENT POSITIONS
3
4
5
6
RELEASE THE STOPPER

[BOTTOM VIEW OF US MECHANISM]

[TOP VIEW OF US MECHANISM]

Fig. 3-13

3-13. Brake (R), take-up brake, take-up reel disk and FR arm

◆ **Mechanism adjustment after reinstalling**

1) Reel disk height adjustment

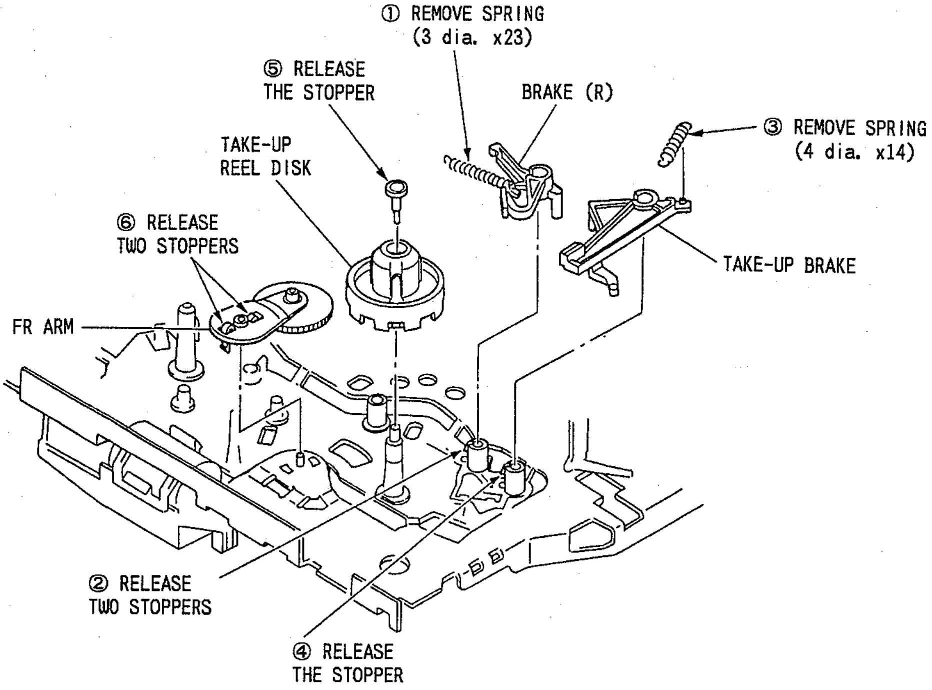

① REMOVE SPRING (3 dia. x23)
⑤ RELEASE THE STOPPER
BRAKE (R)
③ REMOVE SPRING (4 dia. x14)
TAKE-UP REEL DISK
⑥ RELEASE TWO STOPPERS
TAKE-UP BRAKE
FR ARM
② RELEASE TWO STOPPERS
④ RELEASE THE STOPPER

Fig. 3-14

3-14. Safety arm

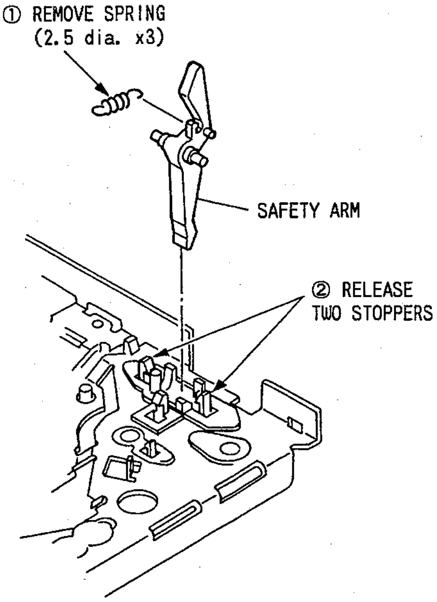

① REMOVE SPRING (2.5 dia. x3)
SAFETY ARM
② RELEASE TWO STOPPERS

Fig. 3-15

3-15. Cam gear and LM wheel gear

◆ **Caution when reinstalling**

1) Align the positions of the cam gear and slider.

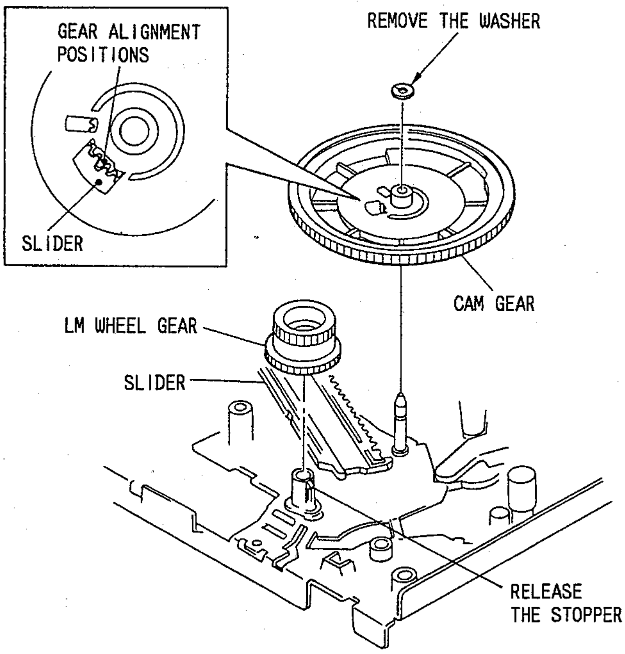

GEAR ALIGNMENT POSITIONS
SLIDER
REMOVE THE WASHER
CAM GEAR
LM WHEEL GEAR
SLIDER
RELEASE THE STOPPER

Fig. 3-16

3-16. Loading gears (R) and (L)

◆ Caution when reinstalling

1) Align the positions of loading gears (R) and (L).

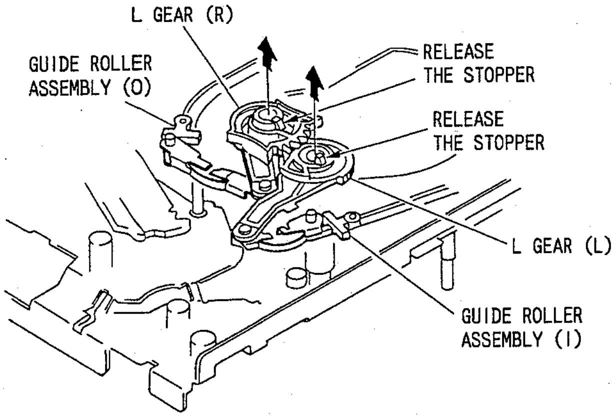

L GEAR (R)
GUIDE ROLLER ASSEMBLY (O)
RELEASE THE STOPPER
RELEASE THE STOPPER
L GEAR (L)
GUIDE ROLLER ASSEMBLY (I)

Fig. 3-17

【Items to check concerning gear alignment around loading gears】

(A) Engaged section between loading gears (R) and (L)

(B) Engaged section between the cam gear and slider

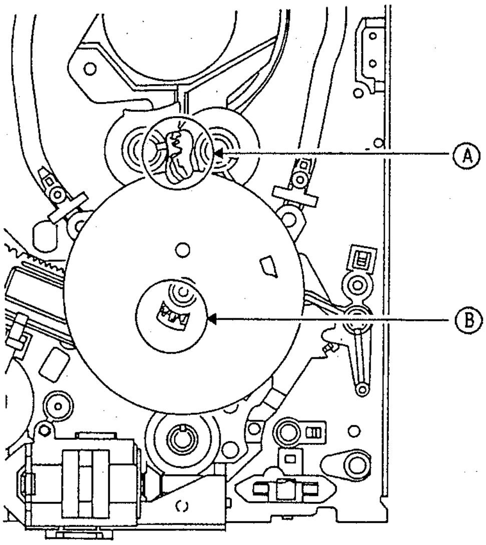


Fig. 3-18

3-17. Pulley assembly, drive belt, torque change arm, torque change gear, FR drive gear and transmission gear

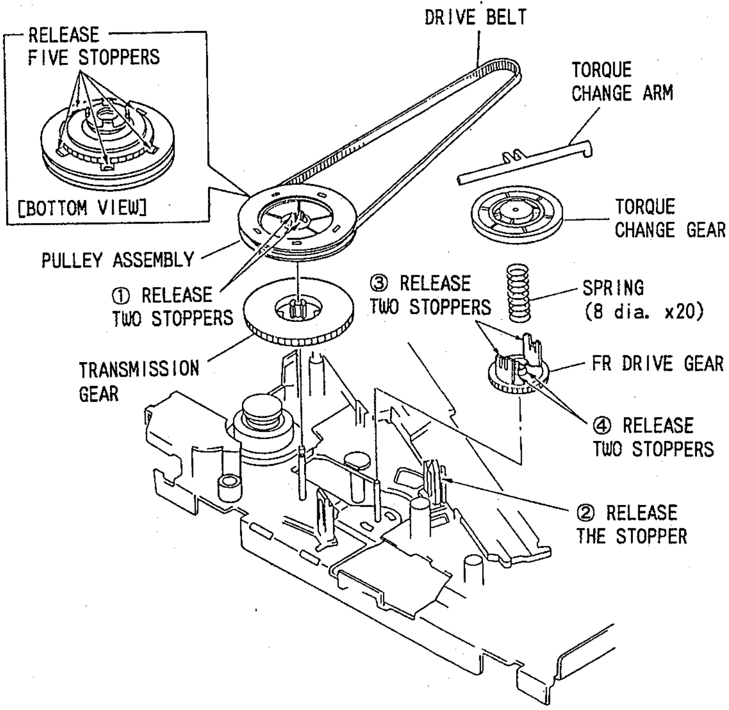

RELEASE FIVE STOPPERS
[BOTTOM VIEW]
DRIVE BELT
TORQUE CHANGE ARM
TORQUE CHANGE GEAR
PULLEY ASSEMBLY
① RELEASE TWO STOPPERS
③ RELEASE TWO STOPPERS
SPRING (8 dia. x20)
TRANSMISSION GEAR
FR DRIVE GEAR
④ RELEASE TWO STOPPERS
② RELEASE THE STOPPER

Fig. 3-19

3-18. FL idler gear and FL change gear

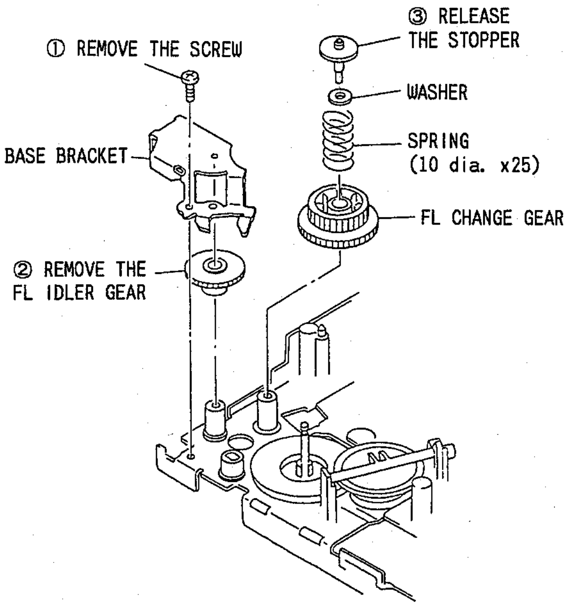

① REMOVE THE SCREW
③ RELEASE THE STOPPER
WASHER
BASE BRACKET
SPRING (10 dia. x25)
FL CHANGE GEAR
② REMOVE THE FL IDLER GEAR

Fig. 3-20

3-19. Slider

◆ **Tips when reinstalling**

1) Align the projection at the left of the slider and the boss of the chassis.
2) Pull the take-up brake in the direction of the arrow and reinstall the slider.

[TIP FOR INSTALLATION (1)]

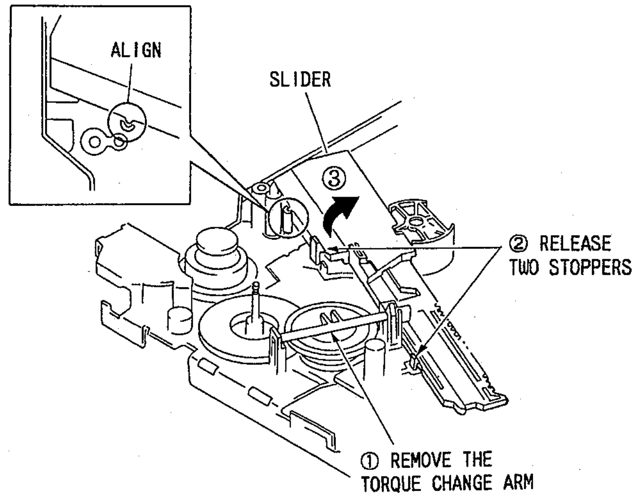

ALIGN
SLIDER
③
② RELEASE TWO STOPPERS
① REMOVE THE TORQUE CHANGE ARM

Fig. 3-21

[TIP FOR INSTALLATION (2)]

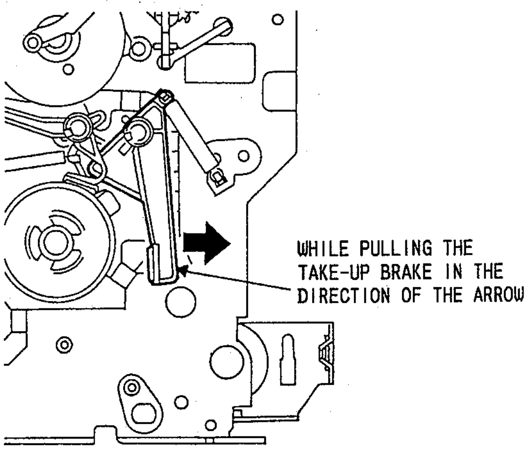

WHILE PULLING THE TAKE-UP BRAKE IN THE DIRECTION OF THE ARROW

Fig. 3-22

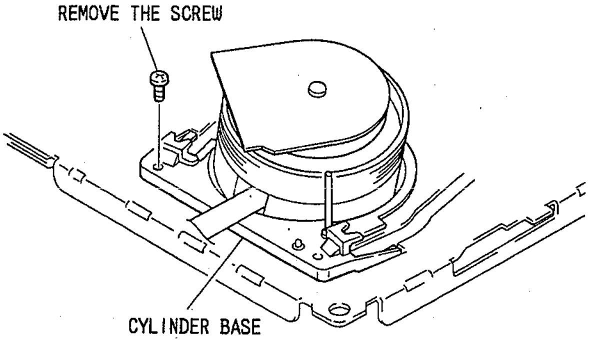
3-20. Cylinder base and guide roller assemblies

◆ **Caution when reinstalling**

1) Clean the surfaces of the guide rollers with which the tape comes into contact.

◆ **Mechanism adjustment after reinstalling**

1) Guide roller height adjustment


REMOVE THE SCREW
CYLINDER BASE

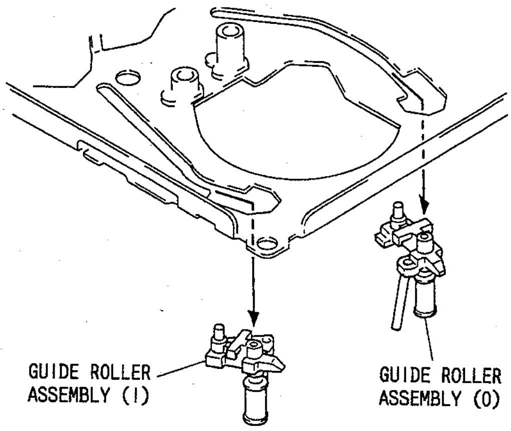

GUIDE ROLLER ASSEMBLY (I)
GUIDE ROLLER ASSEMBLY (O)

Fig. 3-23

Items to Check After Reinstalling the US Mechanism

After dismantling the mechanism or replacing its components, reinstall the components in their original positions correctly and perform the following checks.

Checking the surface of US mechanism

(A) The HC mechanism is set in the correct position.
(B) The engaged section between the spiral gear and PR idler gear is correct.
(C) The engaged section between the PR idler gear and P. drive gear is correct.
(D) The P. out arm is set to the correct position.
(E) The engaged section between the P. drive gear and slider is correct.

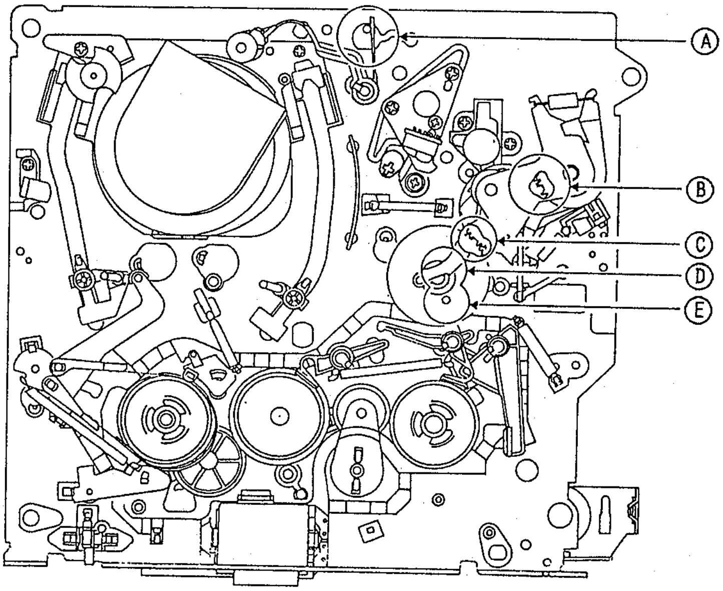


Fig. 3-24

Checking the bottom of US mechanism

(A) The projection of the slider and the boss of chassis are aligned.
(B) The engaged section between the loading gears (R) and (L) is correct.
(C) The sections in which the cam gear and slider are engaged are correct.

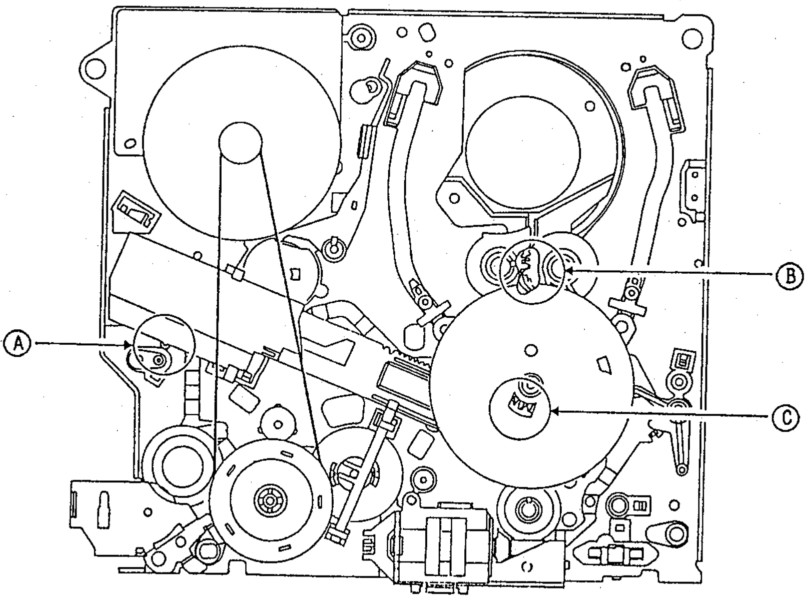
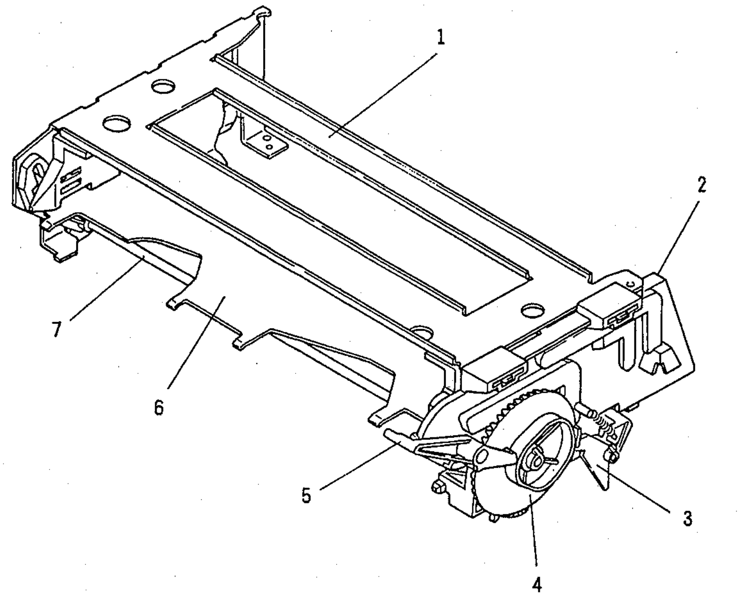


Fig. 3-25

4. Identifications and Locations of Parts in US-FL Mechanism



1. Side bracket (L)
2. Side bracket (R)
3. Switch arm
4. Bevel gear
5. Door arm
6. Cassette holder
7. FL drive arm

Fig. 4-1

5. Procedure to Dismantle the US-FL Mechanism

5-1. Door arm, switch arm, bevel gear and FL gear

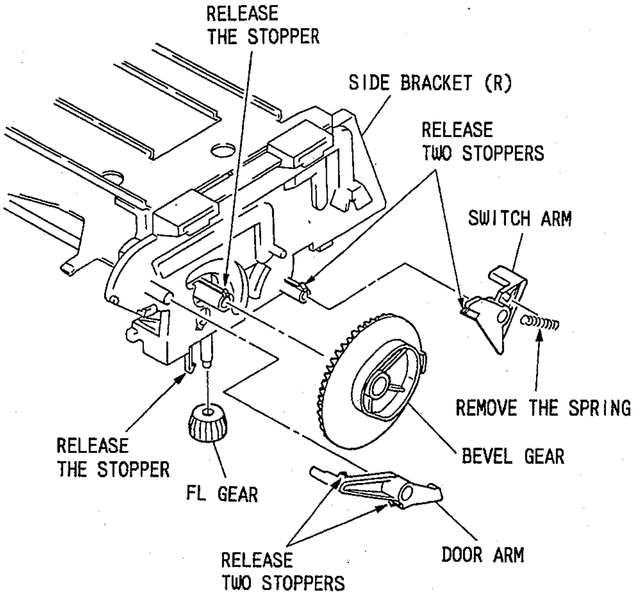

RELEASE
THE STOPPER
SIDE BRACKET (R)
RELEASE
TWO STOPPERS
SWITCH ARM
REMOVE THE SPRING
BEVEL GEAR
RELEASE
THE STOPPER
FL GEAR
RELEASE
TWO STOPPERS
DOOR ARM

Fig. 5-1

◆ Caution when reinstalling

1) Reinstall the bevel gear so the holders in the bevel gear and side bracket (R) are aligned.

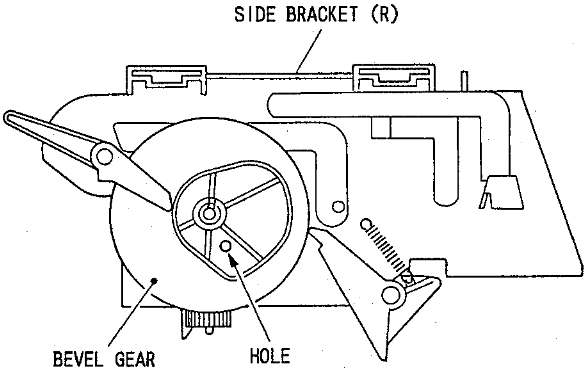

SIDE BRACKET (R)
BEVEL GEAR
HOLE

Fig. 5-2

5-2. Side brackets (R) and (L), cassette holder and FL drive arm

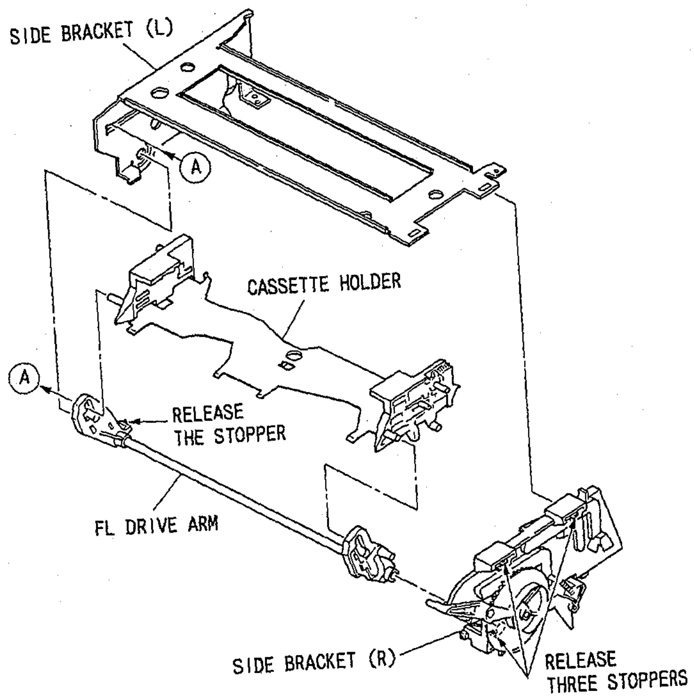

SIDE BRACKET (L)
A
CASSETTE HOLDER
A
RELEASE THE STOPPER
FL DRIVE ARM
SIDE BRACKET (R)
RELEASE THREE STOPPERS

Fig. 5-3

◆ **Cautions when reinstalling**

1) Check the insertion of seven bosses.
2) Align hole (a) in side bracket (R) and the hole in the bevel gear.

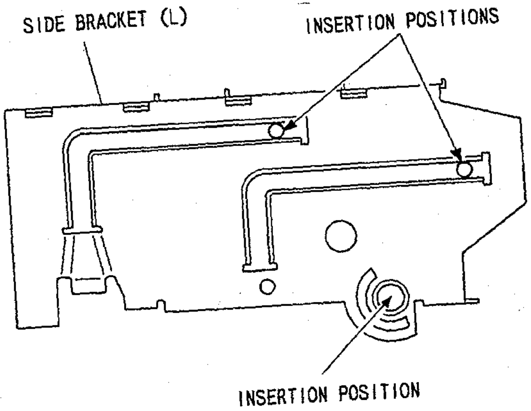

SIDE BRACKET (L)
INSERTION POSITIONS
INSERTION POSITION

Fig. 5-4

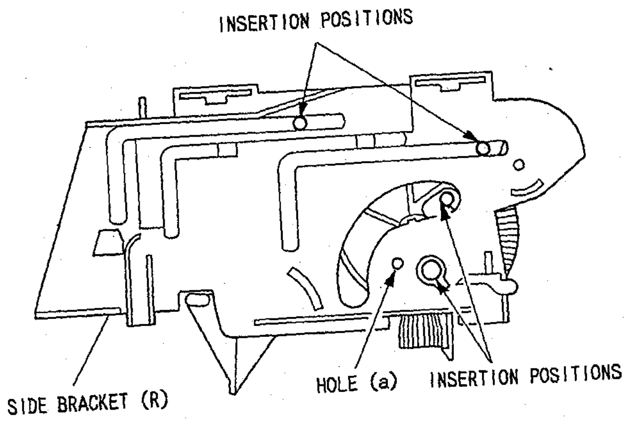
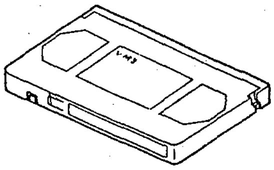
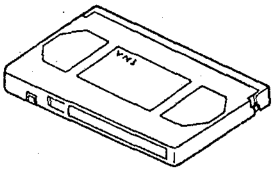
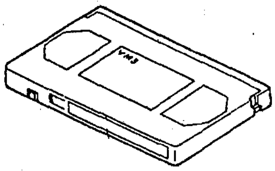
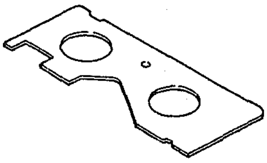
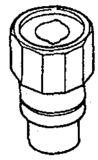
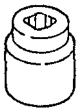
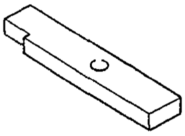
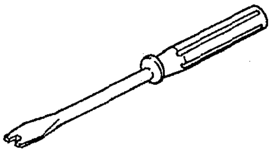

INSERTION POSITIONS
SIDE BRACKET (R)
HOLE (a)
INSERTION POSITIONS

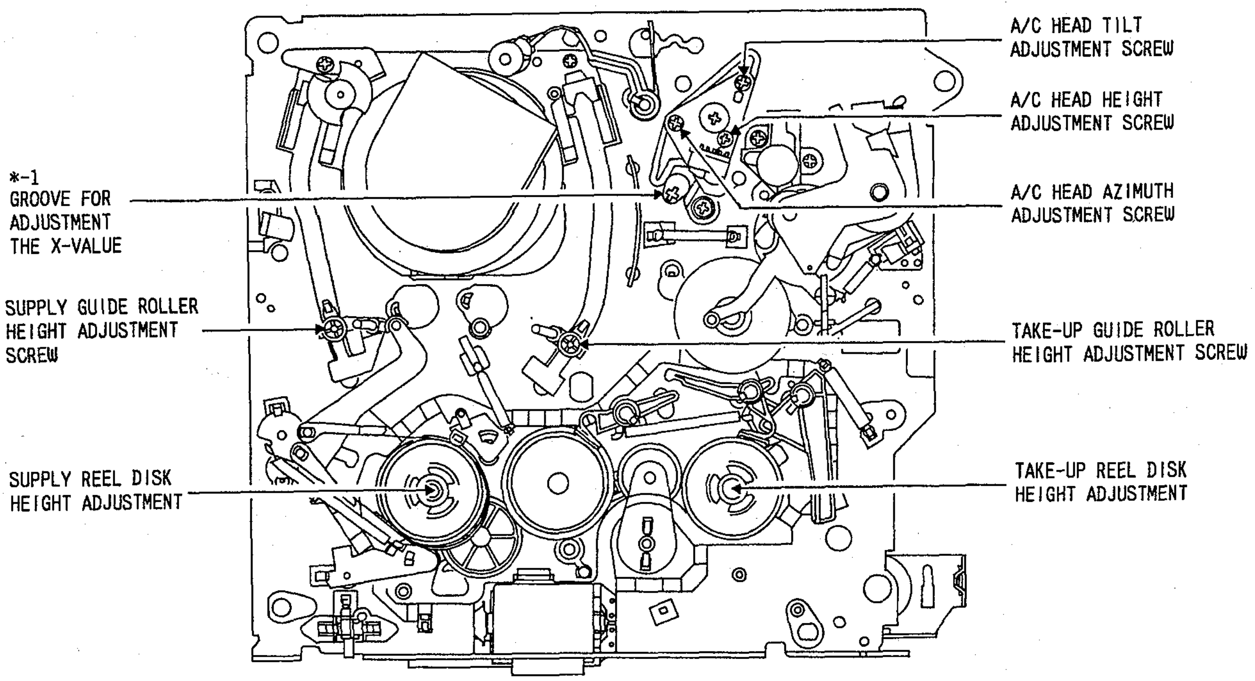
Fig. 5-5

CHAPTER 3 MECHANICAL ADJUSTMENT

1. List of Adjustment Jigs

1. NTSC Alignment Tape [For NTSC] Part No.7099046 	2. 30HMP2-1 Alignment Tape [For NTSC] Part No.7099089 	3. PAL Alignment Tape [For PAL] Part No.7099052 
4. Master Plane Part No.7099279 	5. Torque Gauge Part No.7099039 	6. Torque Gauge Adapter Part No.7099035 
7. Reel Disk Height Jig Part No.7099038 	8. Guide Roller Adjustment Screwdriver Part No.7069064 	

2. Diagram showing Adjustment Locations


A/C HEAD TILT ADJUSTMENT SCREW
A/C HEAD HEIGHT ADJUSTMENT SCREW
*-1 GROOVE FOR ADJUSTMENT THE X-VALUE
A/C HEAD AZIMUTH ADJUSTMENT SCREW
SUPPLY GUIDE ROLLER HEIGHT ADJUSTMENT SCREW
TAKE-UP GUIDE ROLLER HEIGHT ADJUSTMENT SCREW
SUPPLY REEL DISK HEIGHT ADJUSTMENT
TAKE-UP REEL DISK HEIGHT ADJUSTMENT

*-1: For X-value adjustment, refer to the chapter on electrical adjustment in the service manual of each model.

3. Tape Transport Component Adjustments

The tape transport system is a generic term for the path from the supply reel disk to the take-up reel disk via the cylinder (video heads). The tape transport components, especially the components which come into direct contact with the tape, must be kept clean without damage, dust, oil. etc. adhering to the contact surfaces.
When replacing components in the tape transport system, adjust only the new components so the transport system is stabilized.

3-1. Reel disk height adjustment

Purpose: To set the height of reels in the cassette to the specified value so the tape height is determined.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No. 7099279) · Reel disk height jig (Parts No. 7099038)	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	———	· Washers in the supply and take-up reel disks

Adjustment procedure

1) Check that the reel disk is placed between sections A and B of the reel disk height jig.
2) If the above cannot be confirmed, replace the washers (0.5 mm thick) of the reel disk or adjust the number of washers.

[Procedure to replace supply reel disk washers]

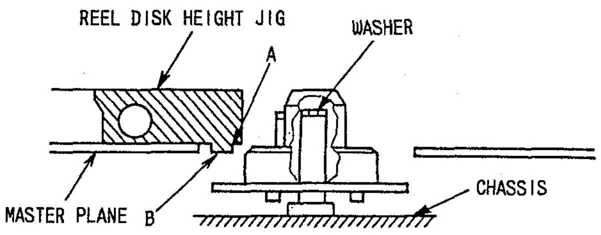
1) Remove the tension arm and tension band.
2) Remove the supply subbrake.
3) Lift the supply reel disk and replace the washers or adjust the number of washers.

[Procedure to replace take-up reel disk washers]

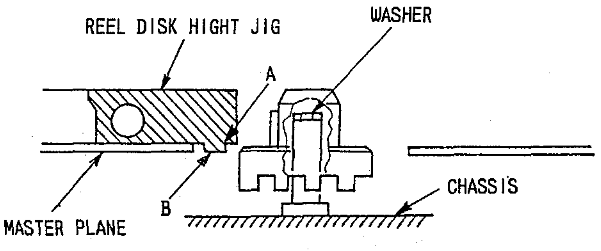
1) Remove brake (R).
2) Lift the take-up reel disk and replace the washers or adjust the number of washers.

Adjustment diagram

[SUPPLY REEL DISK]



[TAKE-UP REEL DISK]



3-2. Tension pole position check

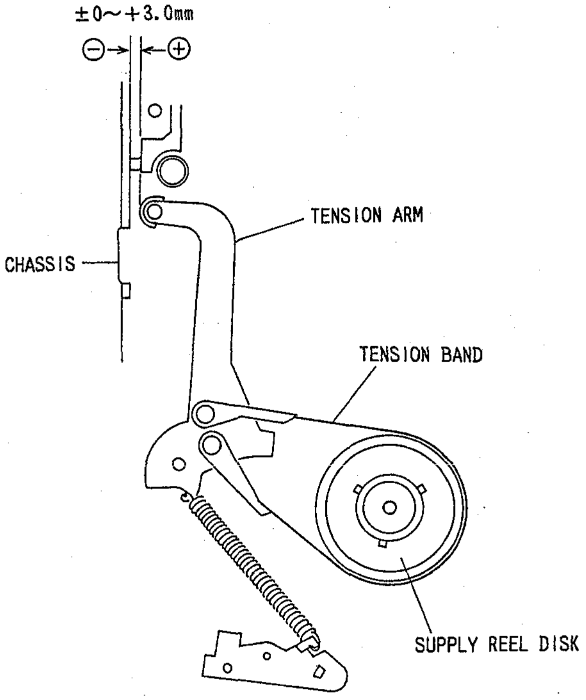
Purpose: To keep the tension of the tape to be supplied constant so the contact between the heads and tape is stabilized.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
——	——	1) Remove the top cover. 2) Set the VCR to the loading state without inserting a cassette. (See page 4-1)	——

Checking procedure

1) Check that the gap between the tension arm and the end of the chassis is ±0 - +3.0 mm.
2) If the tension pole position drifts greatly after checking, replace the tension band.

Checking diagram



3-3. Guide roller height adjustment

Purpose: To regulate the height of the tape so the bottom of tape runs along the tape guideline on the cylinder.

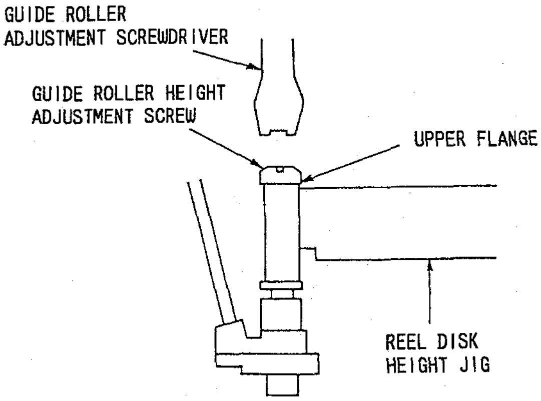
Coarse adjustment

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Part No.7099279) · Reel disk height jig (Part No.7099038) · Adjustment screwdriver (Part No.7069064)	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	————	Height adjustment screws on the supply and take-up guide rollers

Adjustment procedure

1) Turn the height adjustment screw so the upper flange of the guide roller and the top surface of the reel disk height jig are aligned.
2) Continue the precise adjustment.

Adjustment diagram



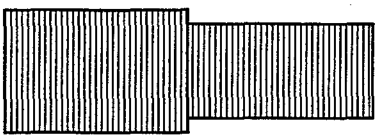
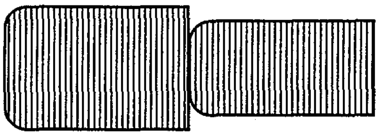
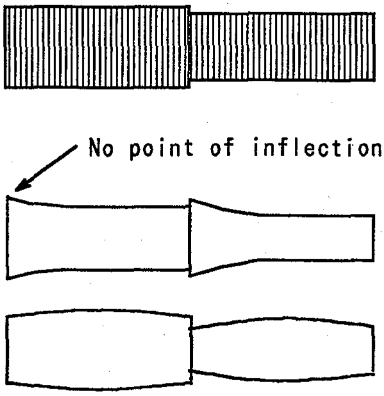
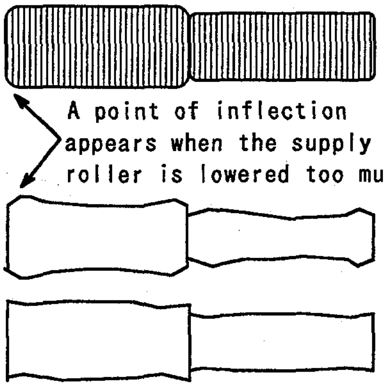
Precise adjustment

Test equipment/jig	Test equipment connection points	State of VCR	Adjustment points
• Oscilloscope	• CH-1: PB FM • CH-2: SW25Hz or 30Hz	• Play alignment tape (Colour bars section)	• Guide roller height adjustment screws
• Alignment tape	———		

Adjustment procedure

1) Set the VCR to the X-value adjustment test mode.
2) Play the alignment tape and press the tracking up and down buttons simultaneously to set the tracking to the centre.
   (When performing this adjustment after replacing the cylinder, set the tracking so the FM output is maximum.)
3) Turn the height adjustment screw little by little so the FM output waveform is flat.
4) Press the tracking up and down buttons and fine adjust the height adjustment screw so the drop in the FM output becomes as shown in the good example in the figure.
5) Release the test mode.

Waveforms

Tracking	Good example	Bad example
When set to centre		
When up and down buttons are pressed	 No point of inflection	 A point of inflection appears when the supply guide roller is lowered too much. Waveform when the supply guide roller is lowered too much.

3-4. Audio/control (A/C) head adjustment

Purpose: To keep the contact between the tape and head constant so the specified track can be recorded and played back.

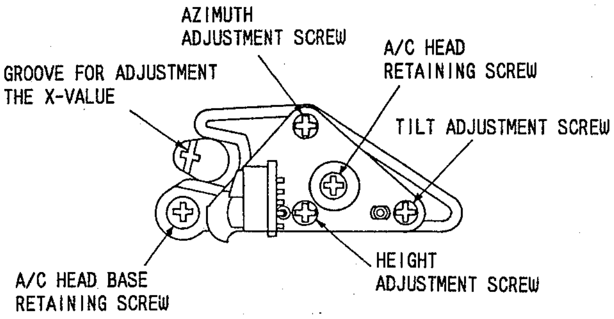
Since the height of A/C head (service part) is adjusted when the VCR leaves the factory, do not turn the height adjustment screw, tilt adjustment screw or azimuth adjustment screw unnecessarily.

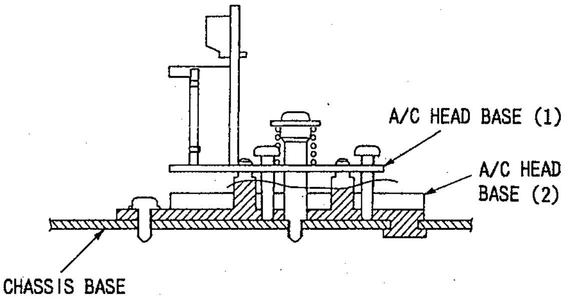
Rough adjustment

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
• Blank tape	———	• Run the blank tape.	•Azimuth adjustment screw •Height adjustment screw •Tilt adjustment screw

Adjustment procedure/adjustment diagrams

1) Load a blank tape and set the VCR to the playback mode.
2) Check that there is no conspicuous curling or riding over of the tape around the A/C head. If conspicuous curling or riding over, etc. occurs, adjust the tilt adjustment screw and azimuth adjustment screw.

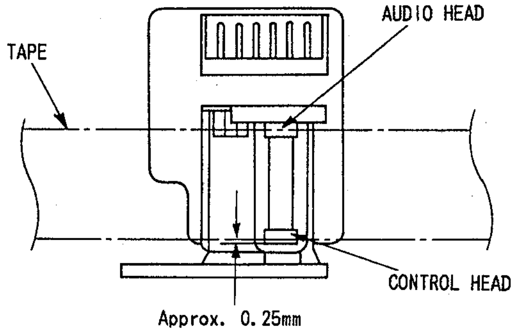

AZIMUTH ADJUSTMENT SCREW
A/C HEAD RETAINING SCREW
GROOVE FOR ADJUSTMENT THE X-VALUE
TILT ADJUSTMENT SCREW
HEIGHT ADJUSTMENT SCREW
A/C HEAD BASE RETAINING SCREW


A/C HEAD BASE (1)
A/C HEAD BASE (2)
CHASSIS BASE

When adjusting the height of the A/C head

Set the VCR to the playback mode. If the height of the A/C head drifts greatly, adjust it by the following procedure.

1) Adjust the height so the tape's bottom edge is approximately 0.25mm above the bottom edge of the control head core.
2) Check that there is no conspicuous curling or riding over of the tape around the A/C head.
3) Continue the precise adjustment.


AUDIO HEAD
TAPE
CONTROL HEAD
Approx. 0.25mm

Precise adjustment

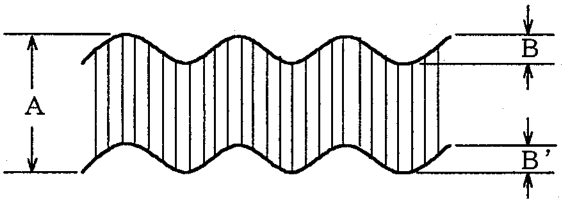
Test equipment/jig	Test equipment connection point	State of VCR	Adjustment points
• Oscilloscope	• AUDIO output jack	• Play alignment tape (Stairsteps section)	• Azimuth adjustment screw • Tilt adjustment screw • Height adjustment screw
• Alignment tape	———		

Adjustment procedure

1) Adjust the azimuth adjustment screw and tilt adjustment screw alternately little by little so the audio output is maximum and flat (with minimum fluctuations).

Supplement: When the A/C head height has been adjusted, also adjust the height adjustment screw alternately with the azimuth and tilt adjustment screws.

Waveform diagram



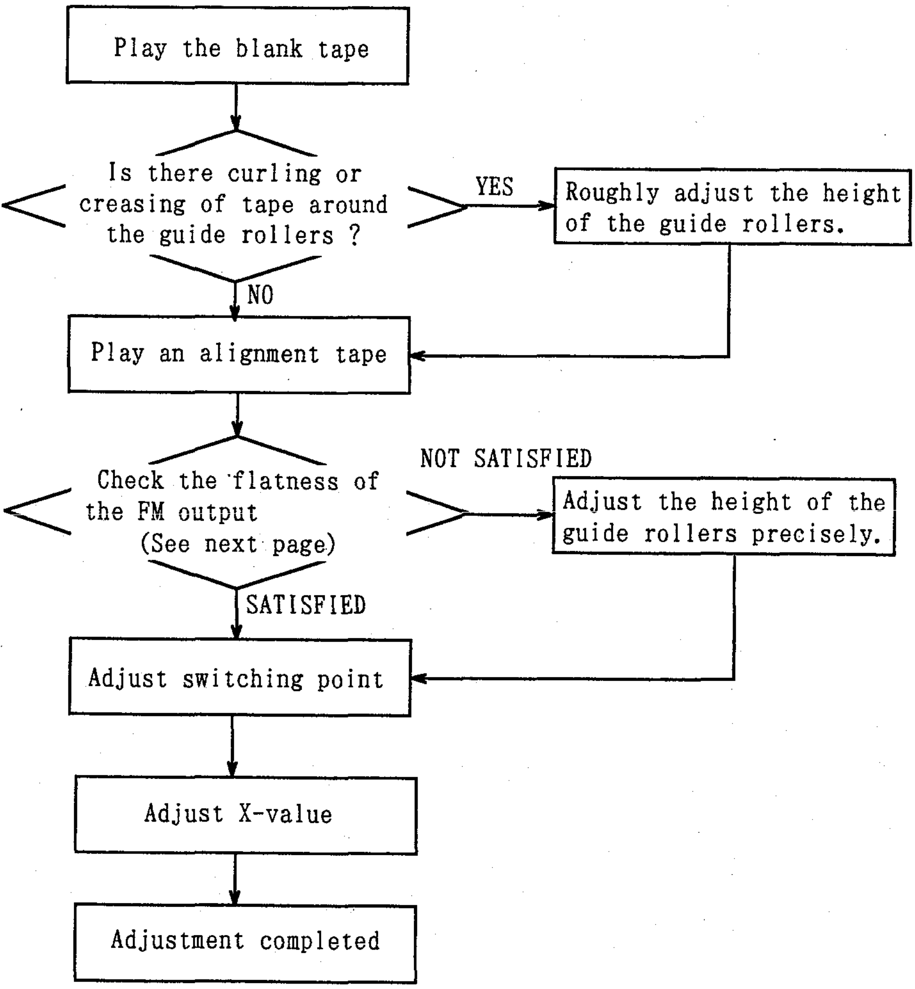
A: Maximum　　B B': Minimum

3-5. Adjustments after replacing the cylinder

Purpose: To eliminate drift in the relative height with the guide rollers, the X-value, etc. However, this drift is very small when the cylinder has been replaced correctly.

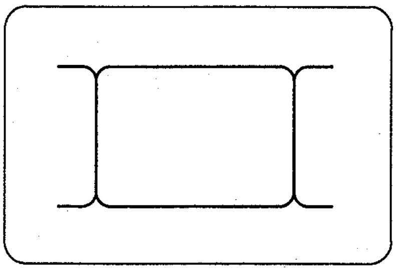
Test equipment/jig	Test equipment connection points	State of VCR	Adjustment points
• Oscilloscope	• CH-1: PB FM • CH-2: SW25Hz or 30Hz	• Run the blank tape	• Guide rollers (precise adjustment on page 3-4)
• Alignment tape	———	• Play alignment tape (Stairsteps section)	[Electrical adjustment] • Head switching point • X-value
• Blank tape	———		

Adjustment procedure

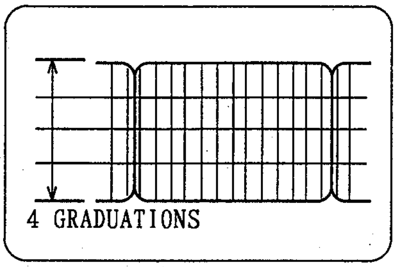

Play the blank tape
Is there curling or creasing of tape around the guide rollers ?
YES
Roughly adjust the height of the guide rollers.
NO
Play an alignment tape
Check the flatness of the FM output (See next page)
NOT SATISFIED
Adjust the height of the guide rollers precisely.
SATISFIED
Adjust switching point
Adjust X-value
Adjustment completed

Checking the flatness and fluctuations of FM output / waveform diagrams

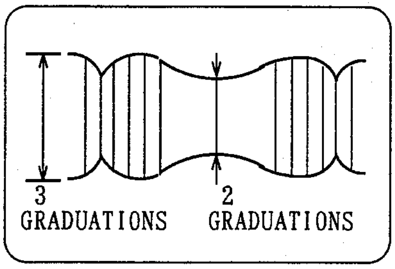
1) Activate autotracking.



2) Finely adjust the voltage level range of the oscilloscope so the FM output is set to 4 graduations.



3) Adjust the tracking so the maximum amplitude of the FM output is set to 3 graduations.
4) Check that the minimum amplitude is more than 2 graduations at this time.



5) Check that the difference between the maximum and minimum level fluctuations is less than 13%.

3-6. Tension/Torque Checks

Purpose: It is necessary to check the tension, torque, compression strength at the tape take-up and moving sections to smooth the running of tape and satisfy the basic performance of the VCR. Perform this check if the running of tape is not smooth or the tape speed is abnormal.

Test equipment/jigs	State of VCR
• Torque gauge • Torque gauge adapter	• Set the VCR to each operation mode without inserting a cassette. (See page 4-1)

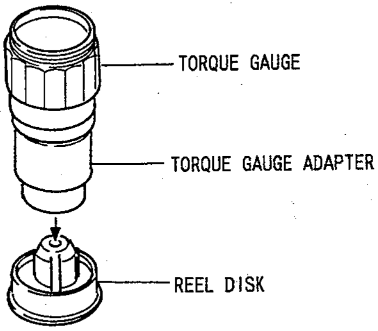
Item	VCR operation mode	Measured reel	Measured value
Main brake torque	Stop (Note)	Supply & take-up reels	100 ~ 300 g・cm
Slack removal torque	Unloading	Supply reel	95 ~ 180 g・cm
Fast forward torque	Fast forward	Take-up reel	400 g・cm or more
Rewind torque	Rewind	Supply reel	400 g・cm or more
Take-up torque	Playback	Take-up reel	45 ~ 75 g・cm
Back-tension torque	Fast forward/Rewind	Supply & take-up reels	5 ~ 20 g・cm
Playback back-tension torque	Playback	Supply reel	25 ~ 36 g・cm
Reverse search torque	Reverse search	Supply reel	95 ~ 250 g・cm
Reverse play torque	Reverse play	Supply reel	95 ~ 150 g・cm
Slow torque	Slow	Take-up reel	30 ~ 75 g・cm
Take-up brake torque	Reverse search	Take-up reel	65 ~ 100 g・cm

Checking procedure

Mount the torque gauge and torque gauge adapter and hold the torque gauge with your fingers for measurement.

Note : Measure in the loading stop-2 state.
(See next page.)

Adjustment diagram



CHAPTER 4 MECHANISM OPERATION CHECK AND MAINTENANCE/INSPECTION

Mechanism Operation Check

Check the mechanism operation after dismantling and adjusting the mechanical block.
Check the operation after setting the mechanism to the loading state without loading a cassette.
If the mechanism does not operate normally, recheck the components and sections related to the area of the abnormality.

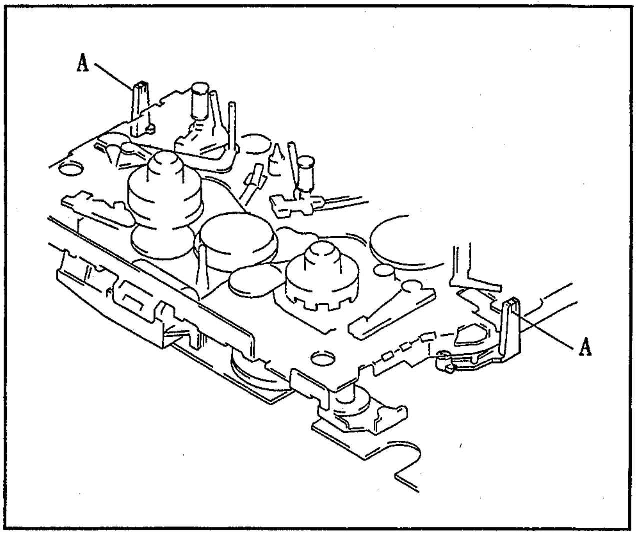
1. Method to set the VCR to the loading state without loading a cassette

Unplug the mains lead from the AC outlet.

Remove the top cover and front panel.

Remove the US front loading (FL) mechanism.

Cover the end sensors (sections A in the figure on the right) with black masking tape, etc. to shut off light.



Plug the mains lead into an AC outlet again and turn the VCR on.

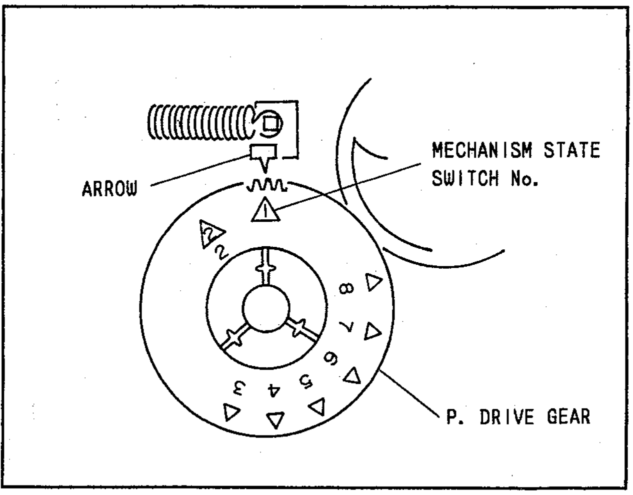
The cylinder rotates and the guide rollers are set to the loading state.
The VCR stands by in the LOADING-STOP 1 mode (mode switch position: 6). *-1

*-1: The VCR can accept the inputs of each mode in this state. However, rewinding can be done for no more than several seconds and the mains supply is shut off because the take-up reel disk is in the stop state and reel pulses cannot be detected. Turn the take-up reel disk manually for rewind operation.

Proceed to the operation check on the next page.

When the stop mode continues for one minute, the pressure roller and tension arm will no longer be pressed. The VCR enters the LOADING-STOP 2 mode (mode switch position:7). After five more minutes, the cylinder is stopped.

[Method to check the position of the mechanism mode switch]
Check the mode position by observing the arrow on the spring hook which is positioned in front of the A/C head and the arrow no. on the P. drive gear.



2. Checking the operation in each mode

Operation in each mode	Mode switch position
LOADING-STOP 1 mode	6

Recording/playback modes

Press the record or playback button of the VCR. The take-up reel disk starts to turn.	6
Press the stop button of the VCR. The take-up reek disk stops.	6

* To set to the record mode, pull the safety arm forward.

Still play mode

Press the playback button of the VCR. The take-up reel disk starts to turn.	6
Press the pause button. Take-up reel disk and capstan stop.	5
Press the stop button. The take-up reel disk and capstan turn forward and then stop.	6

Record pause mode

Press the record button of the VCR. The tension arm is released and the supply reel disk turns in reverse.	3
The tension arm is pressed and the take-up reel disk and capstan shaft to turn forward.	6
Press the pause button. The tension arm is released and the supply reel disk turns in reverse, then the take-up reel disk and capstan shaft turn forward. When the start of a programme is located, the VCR enters the pause mode.	3 ↓ 5

Rewind mode

Press the rewind button. The tension arm is released and the T-brake is applied.	6 ↓ 3
The reel disk starts to turn.	3
Press the stop button. The T-brake is released and the tension arm is pressed.	6

After completing the check, be sure to reset the VCR to the original state by the following procedure.

1) Turn the VCR off.
2) Remove the masking tape, etc. from the supply and take-up end sensors.
3) Unplug the mains lead from the AC outlet to reset the microprocessor(s).
4) Install the cassette loading mechanism to complete the work.

Maintenance/ Inspection Procedure

1. Necessity of Maintenance and Inspection

The recording density of a VCR is much higher than that of an audio recorder. A VCR uses very precise components to ensure compatibility with other VCRs. If any of mechanical components are worn or dirty, the symptoms will be the same as if the VCR has malfunctioned. To ensure a good picture, it is necessary to clean and lubricate the mechanism periodically and replace worn-out components.

2. Scheduled Maintenance and Inspection

Schedules for maintenance and inspection are not fixed because they vary greatly according to the way in which the customer uses the VCR and the environment in which the VCR is used. But, in general home use, a good picture is ensured if inspection and maintenance are done every 1,000 hours of use. Table 1 shows the relation between the time used and inspection period.

3. Before Determining that the VCR is Faulty

When a VCR has been used for over 1,000 hours, the symptoms shown in Table 2 may be seen in the playback picture. These faults may be remedied by cleaning and lubricating mechanical components. Check the hours for which the VCR has been used referring to Table 1. If you determine that the VCR is ready for inspection and maintenance, check the inspection locations shown in Table 2.

Caution: If the VCR cannot be restored to normal operation after cleaning components marked "○" in the part replacement column, they are degraded. Replace them.

Table 1

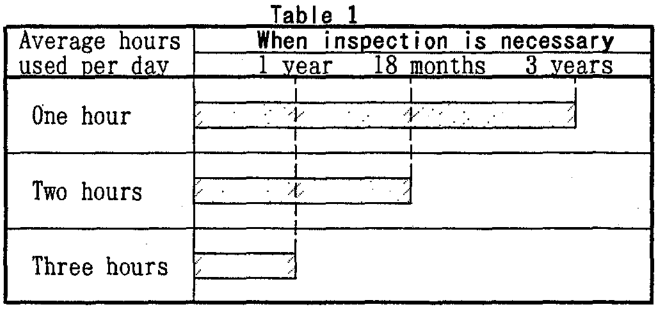


Table 2

Symptom	Cause	Inspection location	Replacement
Colour beats	Dirt on full erase (FE) head	Clean the surface of FE head which is in contact with tape	
Poor S/N, no colour	Dirt on video heads (or they are degraded)	Clean video heads	○
Vertical jitter, horizontal jitter	Dirt on video heads and cylinder. Dirt in tape transport system.	Clean video heads and cylinder. Clean guide rollers and inclined guides.	
Low volume or sound distorted	Dirt on audio/control (A/C) head	Clean the surface of the A/C head which is in contact with tape	○
Tape is slack or does not run	Dirt on pressure roller	Clean pressure roller and capstan shaft	○

Inspection Locations

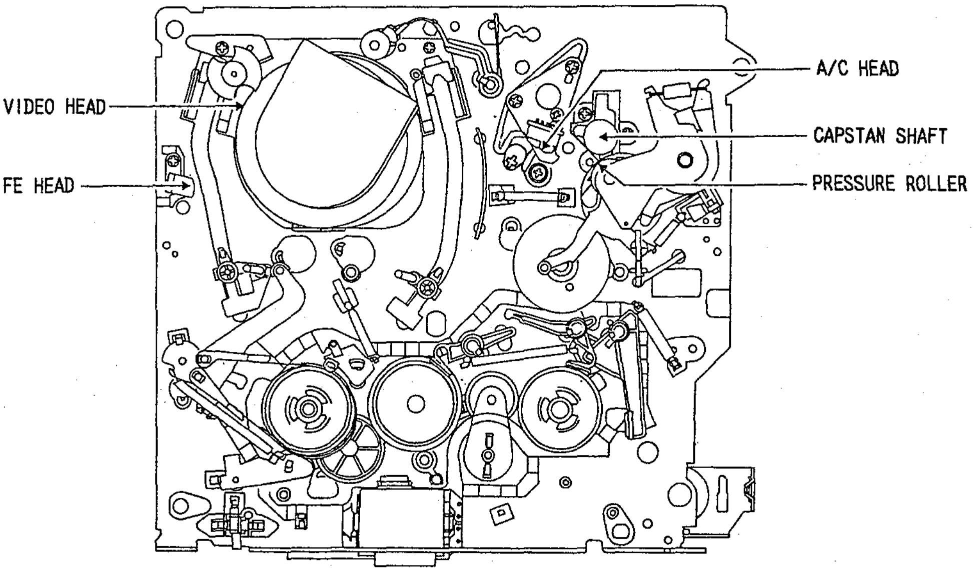


Fig. 1 Inspection Location Diagram

4. Tools Needed for Inspection and Maintenance

(1) Head cleaning kit (Fig. 2)
(2) Grease and oil for maintenance (Fig. 3)
(3) Alcohol
(4) Gauze

Head Cleaning kit

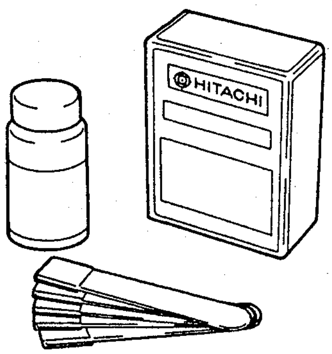


Fig. 2

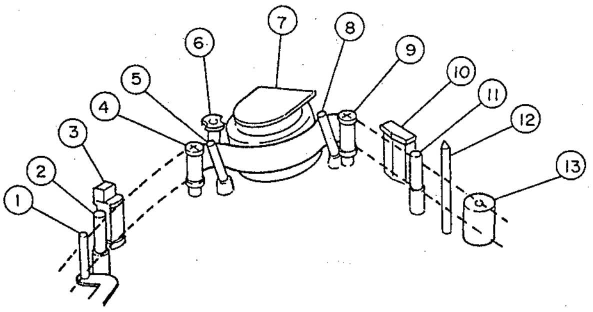
Table 3 Locations for Use of Oil and Grease for Maintenance

Name	Lubricating or greasing location
Sonic Slidas Oil (#1600)	Lubricate low-speed rotating sections
Molicoat (PG-641)	Coat metal and mold sections under light load

5. Cleaning Procedure

1) Cleaning the video heads (Fig. 4)
First use a cleaning tape. If the dirt on the heads is too stubborn to be removed by the tape, use the head cleaning kit to clean the heads by the following procedure.
Moisten the cleaning stick with cleaning fluid and touch the head tip with the stick and gently turn the head (rotate the cylinder) to the left and right. (Do not move the stick vertically and be sure that only the chamois leather on the stick touches the head tips. Otherwise, the heads may be damaged.) After cleaning, thoroughly dry the heads, then run the tape. If cleaning fluid remains on the heads, the tape may be damaged when it comes into contact with the heads.

2) Cleaning the tape transport system (Fig. 3)
Moisten gauze with alcohol and use it to clean components ① - ⑬ (see "cleaning the video heads" for component ⑦).
Caution: When cleaning, take great care not to damage tape transport components or deform them by applying excessive force.



① Tension pole
② Supply guide pole
③ FE head
④ Supply guide roller
⑤ Supply slant pole
⑥ Impedance roller
⑦ Cylinder
⑧ Take-up slant pole
⑨ Take-up guide roller
⑩ A/C head
⑪ Take-up guide pole
⑫ Capstan shaft
⑬ Pressure roller

Fig. 3

6. Lubricating and Greasing

1) Lubricating guidelines
Use the oiler to apply one or two drop of Sonic Slidas oil. Make sure not to use too much oil because it may spill over and leak out, coming into contact with rotating parts and causing slippage or other problems. If too much oil is applied, wipe clean using gauze moistened with alcohol.

2) Greasing guidelines
Apply grease (Molicoat) with a stick or brush. Do not use too much grease. It may come into contact with the tape transport or drive system. Wipe off any excess and clean with gauze moistened with alcohol.

3) Oil or grease the specified locations referring to Table 4 on the next page.

[Cleaning method]

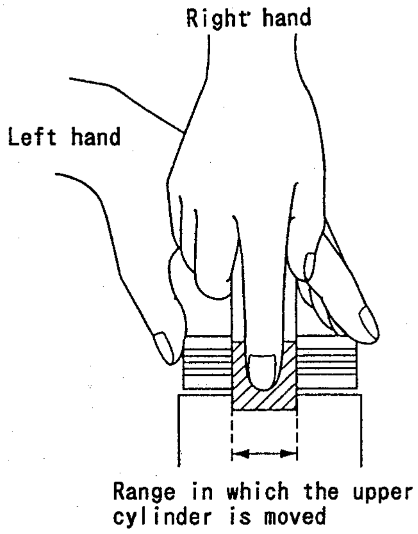


Fig. 4

7. Maintenance/Inspection Schedules of Mechanical Parts

Caution: This timetable shows the period when each component is required to be maintained and inspected. Use the following table as a reference as the maintenance/inspection period depends on how the unit is used and the environment in which it is used.
For components indicated as C/R, replace components if the VCR does not become normal after being cleaned.

Table-4

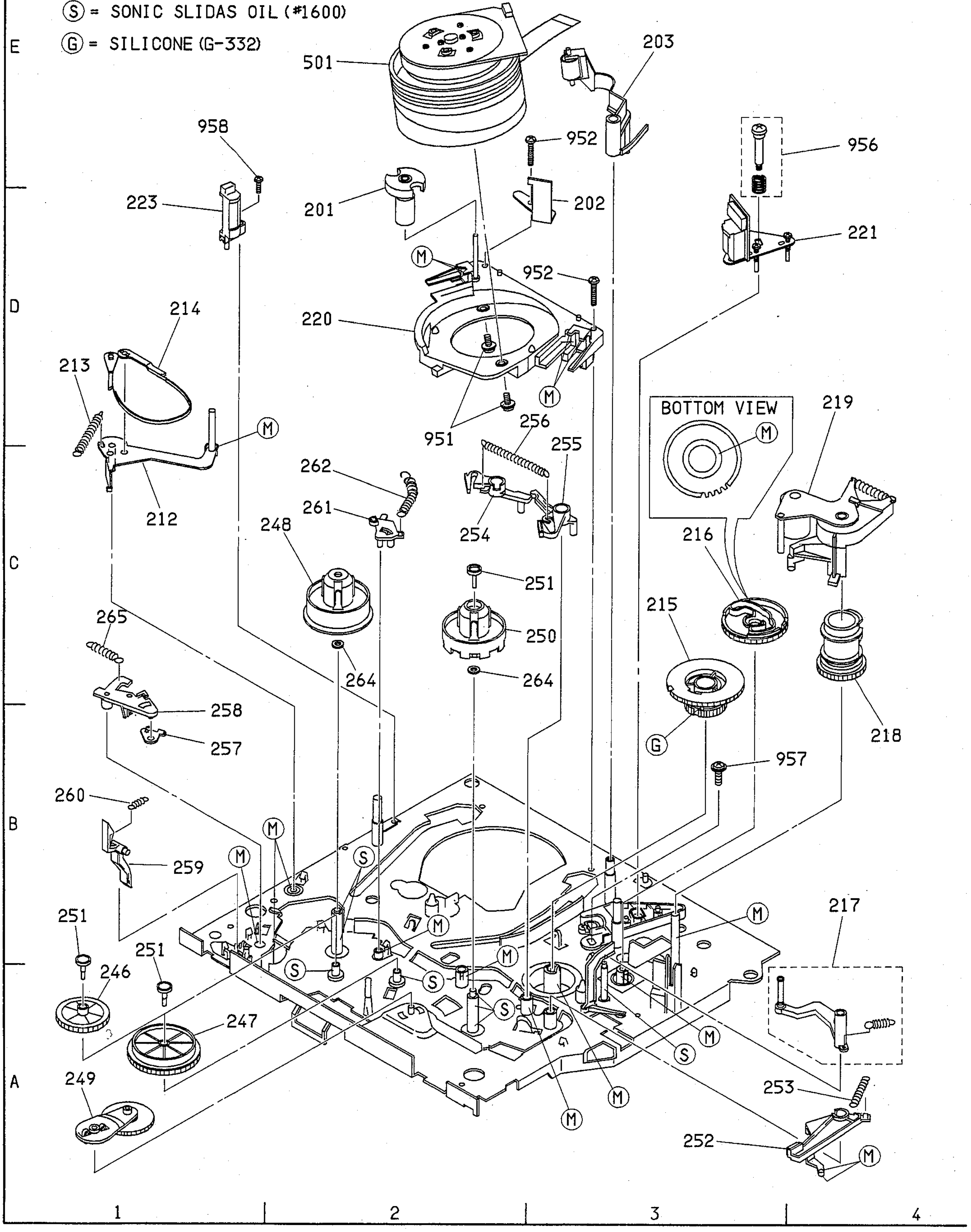
Component	Hours				
	1000	2000	3000	4000	5000
Video heads (cylinder motor)	C/R	C/R	C/R	C/R	C/R
Audio/control (A/C) head	C	C/R	C	R	C
Full erase (FE) head	C	C	C	R	C
Supply guide roller	C	C	C/R	C	C
Take-up guide roller	C	C	C/R	C	C
Tension band		R		R	
Tension arm	C	C	C	C	C
Supply reel disk		C		C	
Take-up reel disk		C		C	
Pressure roller assembly	C	R	C	R	C
Drive belt		C		C	
Capstan motor	C	R	C	R	C
Loading motor				R	
Cylinder motor		R		R	
Mechanism state switch				(R)	
Idler gear 1		R		R	
Idler gear 2		R		R	
FR gear		R		R	
Supply slant pole	C	C	C	C	C
Take-up slant pole	C	C	C	C	C
Impedance roller	C	C	C	C	C
Guide pole	C	C	C	C	C
Tape guideline on cylinder	C	C	C	C	C
Brake (L)	C	C/R	C	C/R	C
Brake (R)	C	C/R	C	C/R	C
HC arm					(R)
Shaft and bearing of supply reel disk		S		S	
Shaft and bearing of take-up reel disk		S		S	
Shaft and bearing of idler gear 1		S		S	
Shaft and bearing of idler gear 2		S		S	
Shaft of pulley assembly		S		S	
Shafts of torque change gear and FR drive gear		S		S	
Shaft of pressure roller arm		M		M	
Guide roller base moving sections in chassis					M
Surface of contact between cylinder motor base and guide roller base during loading					M
Surface of contact between tension arm and supply guide roller base					M

R: Replacement of parts
C: Cleaning
S: Lubricating oil (Sonic Slidas oil)
M: Coating grease (Molicoat)

CHAPTER 5 EXPLODED VIEWS

1. US-MECHANISM (TOP VIEW) SECTION

Ⓜ = MOLICOAT (PG-641)
Ⓢ = SONIC SLIDAS OIL (#1600)
Ⓖ = SILICONE (G-332)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203
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201
202
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220
214
213
212
951
256
255
BOTTOM VIEW
219
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261
254
248
216
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250
265
215
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264
258
257
218
957
260
259
217
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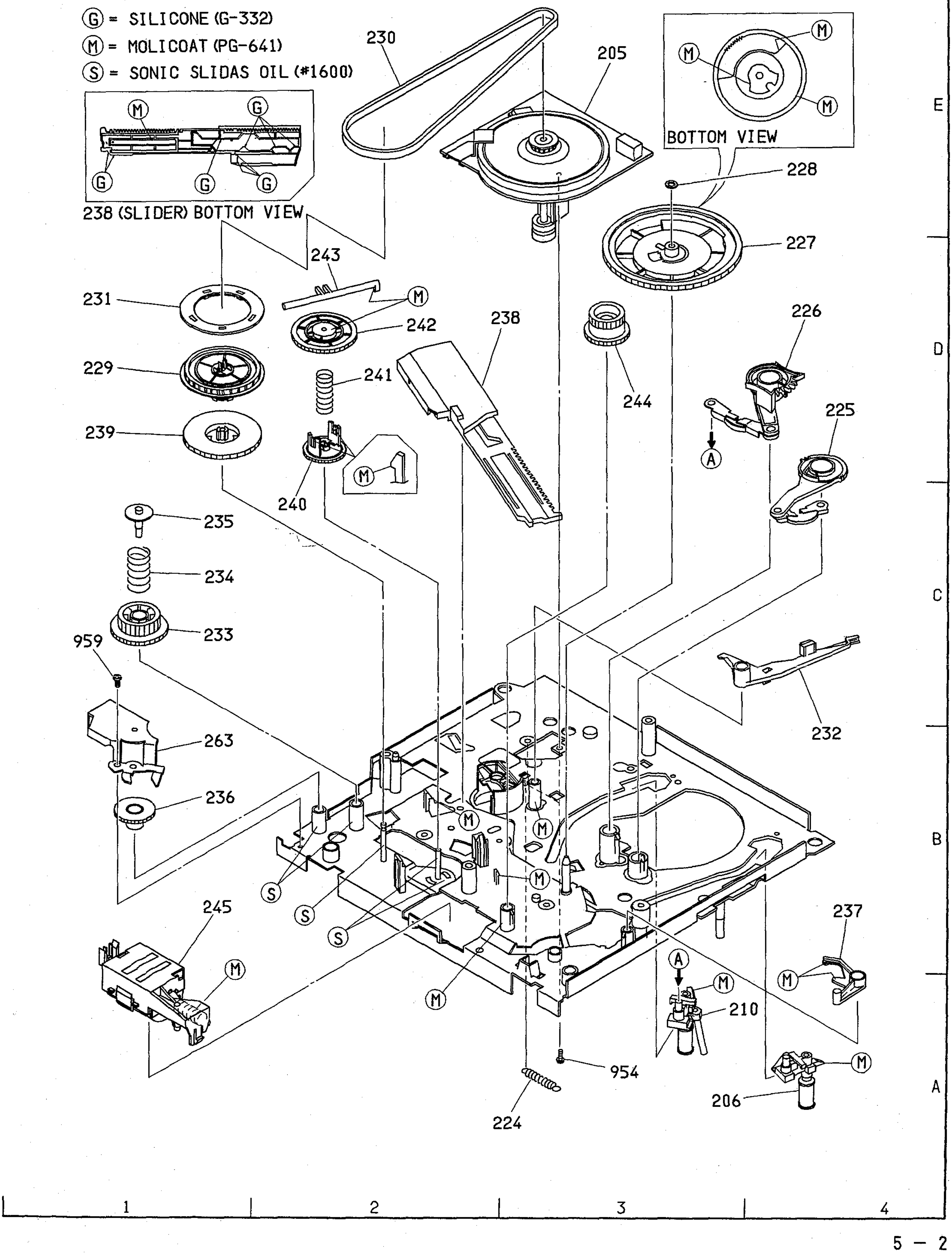
246
251
247
249
253
252
M
S
G

2. US-MECHANISM (BOTTOM VIEW) SECTION

Ⓖ = SILICONE (G-332)
Ⓜ = MOLICOAT (PG-641)
Ⓢ = SONIC SLIDAS OIL (#1600)


238 (SLIDER) BOTTOM VIEW
BOTTOM VIEW
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205
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226
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245
237
210
954
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224
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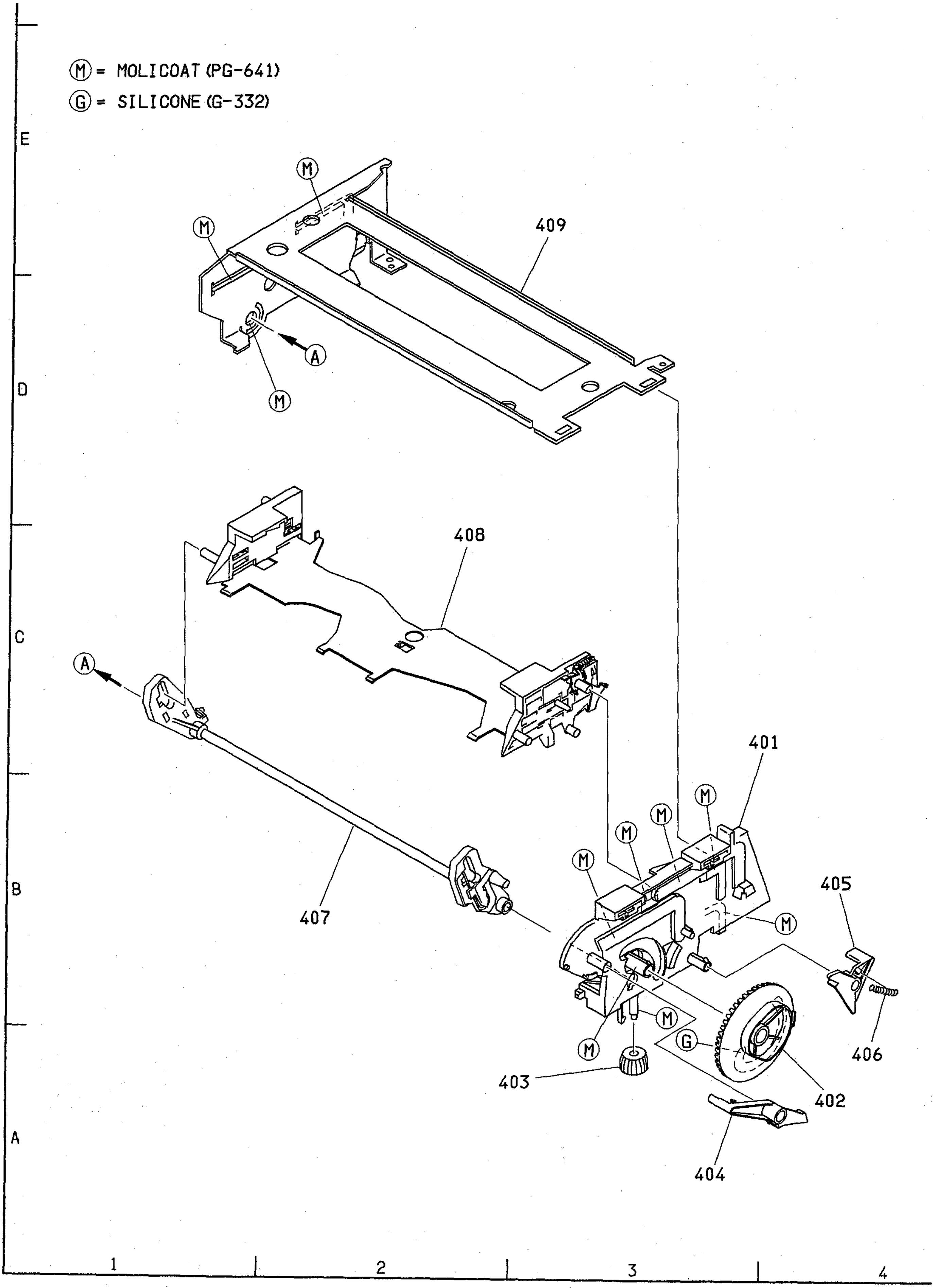
3. US-FL MECHANISM SECTION

Ⓜ = MOLICOAT (PG-641)

Ⓖ = SILICONE (G-332)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Identifications of Components in US Mechanism

Index No.	Component
201	Impedance roller
202	Impedance plate
203	Head cleaning (HC) mechanism
204	FL mechanism assembly
205	Capstan motor
206	Guide roller base (I) assembly
210	Guide roller base (0) assembly
212	Tension arm
213	Spring
214	Tension band
215	P. drive gear
216	PR idler gear
217	P. out arm
218	Spiral gear
219	Pressure roller arm
220	Cylinder base
221	A/C head assembly
223	FE head
224	Spring
225	Loading gear (L)
226	Loading gear (R)
227	Cam gear
228	Poly-slider washer
229	Pulley assembly
230	Drive belt
231	Flange
232	FS brake
233	FL change gear
234	Spring
235	Spring hook
236	FL idler gear
237	Take-up operation arm
238	Slider
239	Transmission gear
240	FR drive gear
241	Spring
242	Torque change gear
243	Torque change arm
244	LM wheel gear
245	Loading motor assembly
246	Idler gear 1
247	Idler gear 2
248	Supply reel disk
249	FR arm
250	Take-up reel disk
251	Stopper
252	Take-up brake
253	Take-up brake spring
254	Brake (L)
255	Brake (R)
256	Spring
257	Jog gear
258	Jog arm
259	Safety arm
260	Spring
261	Supply subbrake
262	Spring
263	Base bracket
264	Washer
265	Spring
401	Side bracket (R)
402	Bevel gear
403	FL gear
404	Door arm
405	Switch arm
406	Spring
407	Drive arm
408	Cassette holder
409	Side bracket (L)
501	Cylinder motor
951	Screws (3 x 8)
952	DT screws (2.6 x 10)
953	DT screws (2.6 x 6)
954	BT screws (2.6 x 6)
956	Screws
957	Screws (M2.6)
958	DT screws (2.6 x 8)
959	DT screws (2.6 x 5)